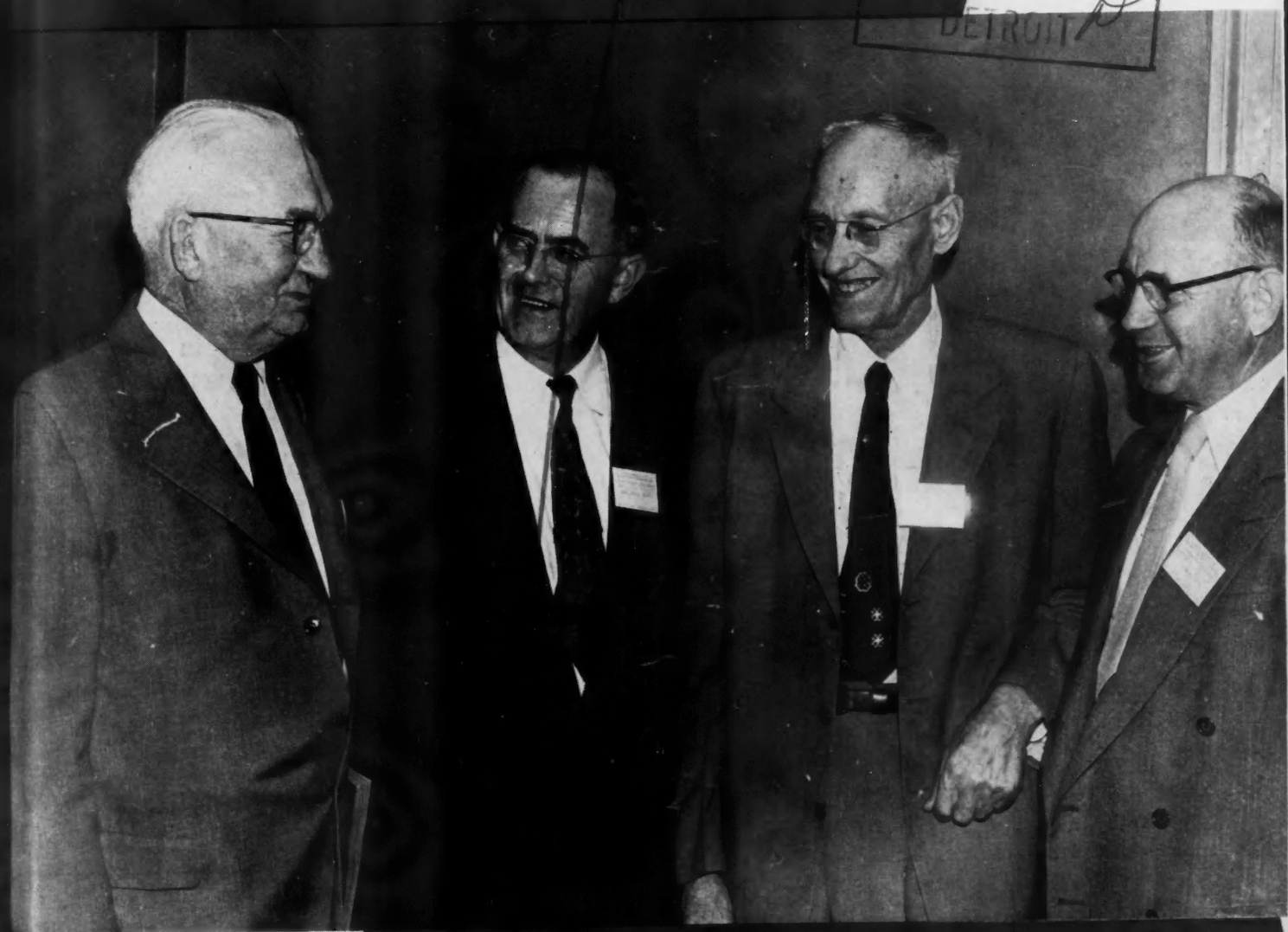
TELEPHONE and Management ENGINEER

...OGY DEPT.

JANUARY
1956

60-1

...C LIBRARY
...B 2 1956
DETROIT



THE NATIONAL TELEPHONE MAGAZINE

Featuring in This Issue—

- ★ The INDEPENDENTS & NATIONWIDE TOLL DIALING, *by L. A. Hodson*
- ★ JUNCTION TRANSITORS & DIODES, *by F. H. Chase*
- ★ MODERN CABLE CONSTRUCTION, *by John S. Read*
- ★ HANDLING THE PROBLEM EMPLOYE, *by Ernest W. Fair*

...NEWS FEATURES — INDUSTRY — MANAGEMENT — WASHINGTON

Since 1910, more and more Telephone Companies have turned to L. M. Berry and Company to handle their Directory Advertising. As a result, Berry men today are successfully handling more than 950 directories for over 250 Independent and Bell Telephone Companies in 29 different states.

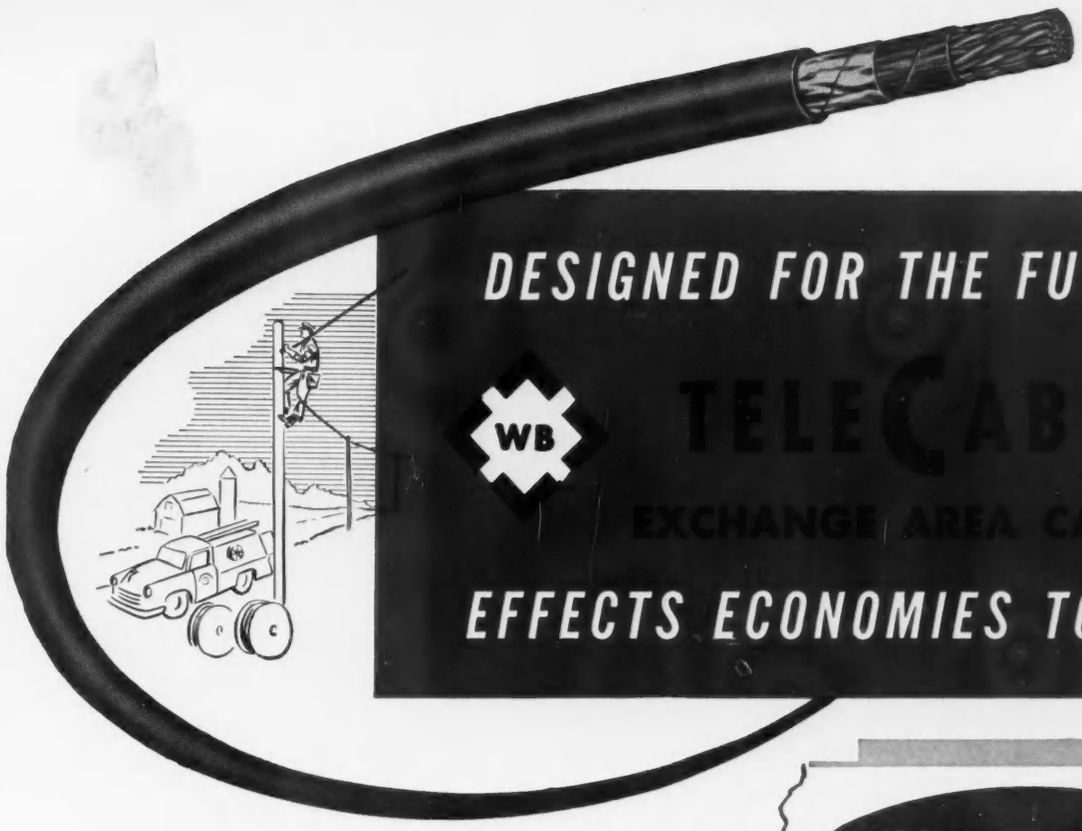
We would welcome an opportunity to handle your directory. Call or write today for details.

1910 **1955**

L. M. BERRY AND CO.

General Offices • Hulman Building • Dayton 2, Ohio • Michigan 7421

Telephone Directory Advertising Exclusively



DESIGNED FOR THE FUTURE

TELECABLE®

EXCHANGE AREA CABLE

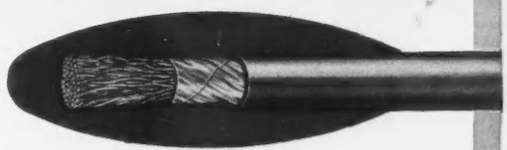
EFFECTS ECONOMIES TODAY!

Your needs today, when correctly interpreted and properly met, mean tremendous savings in the future.

TELECABLE Exchange Area Cable meets today's needs and, as manufactured under Whitney Blake high standards of quality, promises to favorably affect the future economy of the Independent Telephone Industry as greatly as WB TELEPRENE® neoprene jacketed drop wire has in the past ten years.

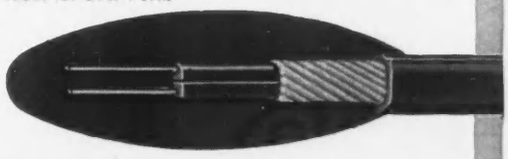
Only products of the highest quality can effect such economies — and the Whitney Blake reputation for top quality products is known throughout the industry.

TELECABLE Exchange Area Cable is available in #24, #22, and #19 AWG, in 11, 16, 26, 51, 76, 101, 152 and 202 pair. It has polyethylene insulation, polyethylene tape over cabled pairs, an aluminum shield and black weather-resistant polyethylene jacket.



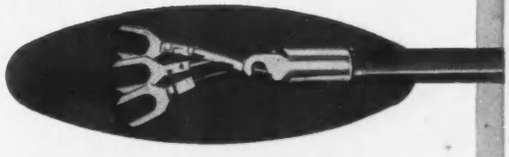
TELECABLE Inside Wiring Cable

TELECABLE INSIDE WIRING CABLE has semi-rigid Plastite® insulation and brown or ivory Plastite jacket. Light in weight. Water resistant. Excellent electrical characteristics. Unaffected by humidity. Ideal for duct work.



TELEPRENE® Neoprene Jacketed Drop Wire

Famous WB long life drop wire has demonstrated that a BETTER wire is much more economical than a CHEAPER wire.



TELECORD® Neoprene Jacketed Telephone Cord

This sturdy, long-lasting telephone cord resists abrasion, perspiration, humidity, oil and grease. Specify TELECORD on new telephones and on replacements for economy and service.

INDEPENDENT

Well Built Wires Since 1899

© 1956

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

Nicopress

The Tool and the Sleeve

that are made to work together

together

they make the perfect splice

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

TELEPHONE and Management ENGINEER

A Telephone Engineer Publication

JANUARY 1956

Vol. 60 No. 1

The National Telephone Magazine

Editor, RAY W. SMITH • *Advertising Director,* ROY F. SMITH
Managing Editor, JOHN G. REYNOLDS
Advertising Mgr., DON C. SORENSEN • *Production Mgr.,* HELEN McCORKLE
Technical Editor, JOHN S. REED • *Traffic Editor,* RUTH E. RICHARDS
Washington Bureau, Editors of "Telecommunications Reports"
Small Company Editor, BILL CORMAN
Circulation Manager, JOYCE McDONALD

ARTICLES

Editorial — "For The Community's Good"		37
The Independents & Nationwide Toll Dialing	L. A. Hodson	41
Junction Transistors and Diodes	F. H. Chase	48
Modern Cable Construction	John S. Reed	61
Handling The Problem Employe	Ernest W. Fair	66

FEATURES

Coming Conventions		6
Industry Newsletter		7
Washington Newsletter		8-A
Across The Editor's Desk		12
Management Newsletter		15
Thoughts For Today	Dick Allen	26
Industry News Briefs		28
Telephone Oddities	Tom Higgins, Jr.	60
Telephone Association Activities		70
North Carolina Convention Report		70
Georgia Independents Meet at Savannah		70
Carl Brorein, Jr., Heads Florida Association		73
Wisconsin Assoc. Holds Management Conference		84
The Back of The Book	John G. Reynolds	102

DEPARTMENTS

New Products' Showcase	88
Buyers' Guide	89
Classified Advertising	90
Professional Cards	91
Advertiser's Index	101

FRONT COVER

Chairman E. L. BEYL, pres., Osceola (Wis.) Farmers Tel. Co., was on hand to welcome those attending Fall Management Conference of Wisconsin State Tel. Assoc. Standing at the right in the picture he extends greetings to COLONEL WM. SMITH, pres., Badger State Tel. & Tel. Co., Neillsville, a former president of the Wisconsin State Tel. Assoc. and one of its originators in 1910; RALPH S. BUTLER, Accounts & Finance Dept., Public Service Commission of Wisconsin, and D. E. PETERSON, pres. of the Midway Tel. Co., Medford. Colonel Smith and Mr. Peterson are the two oldest Pioneers of the telephone industry in Wisconsin. Between them, they have devoted exactly 100 years to it. — ***(For complete story see page 84)***

Volume 60, No. 1. Published monthly by TELEPHONE ENGINEER PUBLISHING CORP. Office of Publication, Rochelle, Ill. Executive and Editorial Office, 7720 Sheridan Road, Chicago, Ill. Telephone — Rogers Park 4-3040. Subscriptions: U. S., and Possessions, $3.00 per year; Canada $3.50; in all other countries, $5.50. Single copies, U.S.A., 35 cents. Entered as second class matter at the post office at Rochelle, Ill. under the act of March 3, 1879.

Copyright 1956 by Telephone Engineer Publishing Corp.

which type jacket do you prefer ?

NYLON? NEOPRENE? MERCERIZED COTTON?

COMMERCIAL makes *all three* . . . REGULAR type Cords with either Mercerized Cotton or Nylon Jackets . . . RETRACTABLE and REGULAR type Cords with Neoprene Jackets . . . for all makes and types of Telephone instruments.

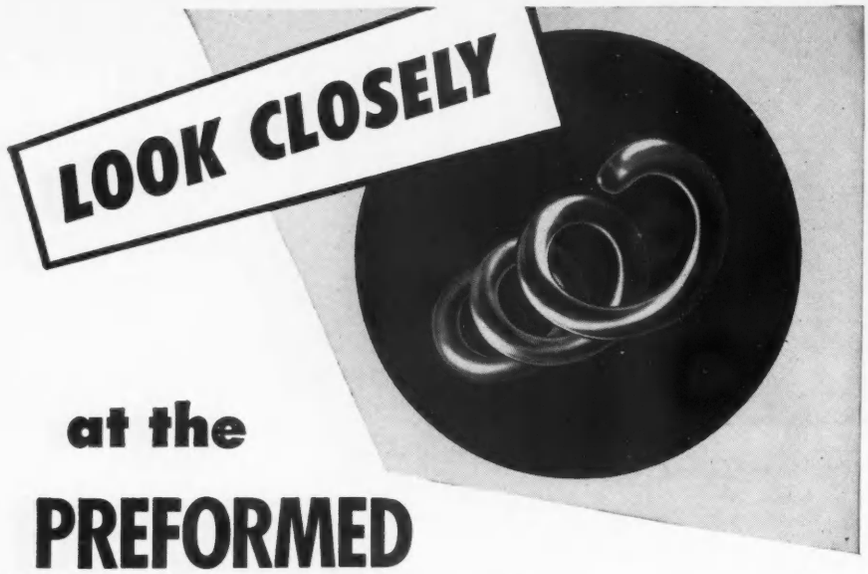
AND DID YOU KNOW *that Commercial Switchboard Cords are now available with or without plugs?*

Write for Catalog and Samples

COMMERCIAL CORD & SUPPLY CO. INC.

26 E. Main St. • Clifton Springs, N. Y.

Phone: CLIFTON SPRINGS 189



LOOK CLOSELY

at the

PREFORMED

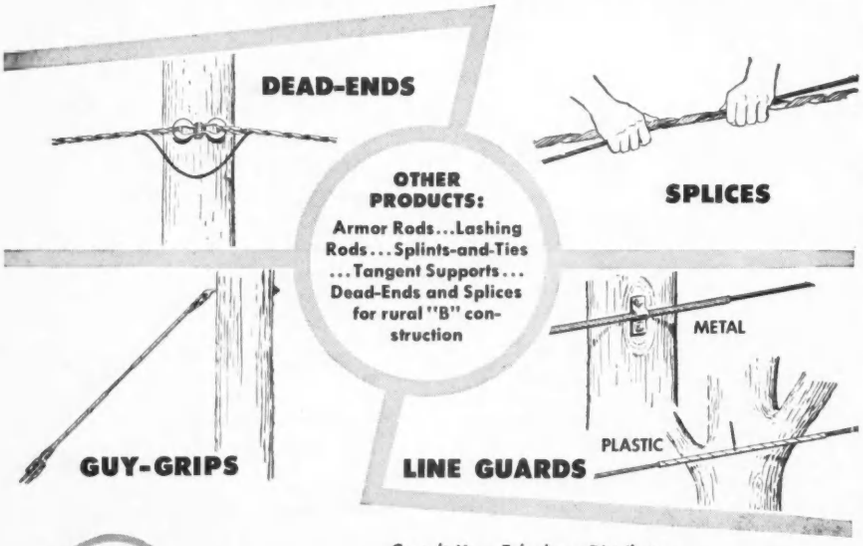
PRINCIPLE

a major advance in line accessory fittings

The Preformed method of producing line accessories is an exclusive new development for the telephone industry. It incorporates the use of Preformed Rods—helically formed within exacting tolerances—to serve varied "fitting" functions all along the line. No more bolts—no compression tools—simplified construction. More than just something new, Preformed Products represent a better, faster and more economical way to *dead-end, splice, support,* or *protect* conductors and strands.

For more information on their exclusive advantages, consult your telephone distributor.

A COMPLETE LINE FOR THE TELEPHONE INDUSTRY...



Consult Your Telephone Distributor

Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587, 521; 2,609,653; 2,691,865; other patents pending.

PREFORMED LINE PRODUCTS COMPANY

5349 St. Clair Avenue • Cleveland 3, Ohio

coming CONVENTIONS

Minnesota Telephone Association, St. Paul Hotel, St. Paul, February 13, 14 *and* 15, 1956.

Kentucky Independent Telephone Association, Phoenix Hotel, Lexington, March 6, 1956.

Texas Telephone Association, Baker Hotel, Dallas, March 12 *and* 13, 1956.

Ohio Independent Telephone Association, Deshler-Hilton Hotel, Columbus, March 27 *and* 28, 1956.

Nebraska Telephone Association, Omaha, (Hotel to be selected), April 3 *and* 4, 1956.

Iowa Independent Telephone Association, Hotel Fort Des Moines, April 10 *and* 11, 1956.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 9 *and* 10, 1956.

Illinois Telephone Association, Hotel Pere Marquette, Peoria, May 16 *and* 17, 1956.

Wisconsin Independent Telephone Association, Loraine Hotel, Madison, May 16 *and* 17, 1956.

Pennsylvania Independent Telephone Association, Bedford Springs Hotel, Bedford, May 22 *and* 23, 1956.

Washington-Oregon Independent Telephone Associations, Hotel Multnomah, Portland, Ore., May 31, *June* 1 *and* 2, 1956.

Kansas-Missouri Telephone Associations, Hotel Muehlebach, Kansas City, Mo., June 4 *and* 5, 1956.

Missouri Telephone Association, Hotel Muehlebach, Kansas City, Mo., June 4 *and* 5, 1956.

INDUSTRY NEWSLETTER

BIG YEAR FOR AT&T

Bell System Companies added nearly 50 per cent more telephones in 1955 than in 1954. Long distance calling increased. Earnings improved. To expand and further improve service, Bell companies spent record sum on new construction . . . These are highlights of year-end statement by Cleo F. Craig, pres. of American Tel. & Tel. Co.

"This has been a year of progress for the Bell System with big gains in service to the public and a very desirable strengthening of our share owners' position," Mr. Craig said. "We added about 2,850,000 telephones in 1955, or close to 50 per cent more than in 1954. Long distance conversations increased nearly 12 per cent, which is well above the average yearly growth. To enlarge and improve service the System spent nearly $1.7 billion for new construction, or about $800,000 every working hour. This was the largest construction program we have ever had. But we expect to do even more in 1956. The country keeps right on growing. Americans need and want more communication service of top quality. We are going full speed ahead to provide it."

Bell System telephones totaled 46,200,000 by year's end — more than double the number in 1945. People are talking more; the average daily number of telephone conversations was 169 million, up almost 10 million a day from '54. The number of dial operated telephones in the Bell System climbed to nearly 87 per cent, from 84 per cent at the beginning of '55. In many areas, telephone users are dialing their own calls within an increasingly wider range. In 65 places, they are able to dial directly to any one of 18 million telephones located in various cities from coast to coast. While telephone mechanization continued, Bell System employment increased from 686,000 to 740,000 during 1955.

LEARNER REGULATIONS

Wage-Hour Administrator Brown announced proposed amendments to regulations governing employment of learner switchboard operators in Independent telephone industry. Amendments would become effective with effective date of new Federal Minimum Wage of one dollar on Mar. 1.

Under proposed amendments length of learning period remains the same (480 hours) as under present regulations (last amended on Jan. 25, 1950). Independent telephone companies may apply for special certificates permitting them after Mar. 1 to pay 80¢ for first 240 hours and 90¢ for remaining 240 hours of learning period at exchanges having less than 3,000 stations. (Present regulations permit subminima at exchanges only up to 2,000 stations.) For exchanges having 3,000 or more stations where unusual circumstances are shown to exist subminima of 85 and 95¢ are authorized for corresponding learning periods. Separate application must be filed for each exchange. Where facts show that certificate is necessary in order "to prevent curtailment of opportunities for employment," it will be issued.

The amendments remove present limitation as to number of learners who may be hired by telephone exchanges employing 18 operators or less; the limitation as to number of learners who may be employed at one time is retained.

Forms for use in applying for certificates can be obtained from Wage & Hour Division, Department of Labor, Washington 25, D. C. Interested companies should file their applications without delay so the Division may act on them prior to Mar. 1.

TOLL SETTLEMENTS

Preliminary discussions looking toward an upward adjustment of toll compensation settlements were held last month in New York City between USITA representatives and Bell System officials. Participating in the discussions in behalf of Independent telephone companies were members of a task force committee comprised of Roy W. Jarmon, chairman of the Toll Compensation Settlements Committee, Edwin L. Blakeslee, William C. Henry, Alden L. Hart, Arthur W. Lambert, and Ralph W. Shriner. Negotiations, based upon the extensive "A," "B" and Line Haul Prorate Studies conducted by Independent telephone companies during the past year, will be resumed this month. The studies were instituted upon premise that present settlement schedules do not properly reflect current costs and inflationary increased expenses to Independent companies. During

INDUSTRY NEWSLETTER

(Concluded From Page 7)

1955, several hundred companies, chosen as representative of a cross section of large, medium, and small Independents, have been engaged in making studies. Results are being used to test adequacy of present compensation schedules.

AIEE MEETING

Eleven of the* 98 *sessions and symposiums scheduled for the Winter General Meeting of the American Institute of Electrical Engineers in the Hotel Statler, New York City, Jan. 30-Feb. 3 will be devoted to radio, television, telephone and telegraph communications. I. S. Coggeshall is chairman of the AIEE Communications Division.

CABLE TRYOUT

Recently developed telephone materials and tools are being used in a long-range Chicago experiment to determine the advantages of various types of underground cable. The trial installations are being made at the Crestline Homes Development in Illinois Bell's Portsmouth exchange area.

Cable will be placed underground with the aid of a small trencher. Terminals of some of the buried cables will be mounted on short wooden posts at the rear of the property lines; others on new steel posts, housed in heavy cement tile, just above the ground.

Another experiment involves splicing wires directly into the cable and enclosing the entire splice in a buried, watertight case. Some home telephones will be connected to the cable by a pair of wires, others by two pairs. Some cable wires link homes from the front, others from the back.

ELECTRONIC PHONE ERA

The familiar telephone ring will be replaced by a musical tone when the world's first electronic telephone exchange goes in experimental operation at Morris, Ill., in two or three years. Illinois Bell Tel. Co. will operate the exchange serving 3,000 customers. Officials of Bell Telephone Laboratories, developer of the system, said the new exchange will mark the start of a gradual change to all-electronic switching systems throughout the country.

Dial systems now use electro-mechanical switches, or relays, which automatically connect two telephones when a number is dialed. These relays operate in about a thousandth of a second. The electronic system, which will employ transistors, will operate a thousand times as fast as the present system. New compact exchange equipment will result in a saving of building space, Bell officials said.

The telephone bell will be replaced by a pleasing musical tone in the new system because it uses much less power than a bell, officials said. The tone will be heard through a small loudspeaker built into the base of the telephone.

HIGHLIGHTS

Kenneth R. Knapp, pres., Champlain (N. Y.) Tel. Co., reports Champlain exchange was cut to dial Jan. 14. Dial cutover at Rouse Point is scheduled for Mar. 1. . . . Southwestern States Tel. Co. will convert Hollis, Okla. exchange to dial . . . Eugene Zerwas, mgr., Manning (Ia.) Tel. Co. announced completion of $125,000 expansion project . . . W. G. Matson, pres., Grenora (N. D.) Tel. Co. announced company has applied for $150,000 REA loan to finance expansion project.

C. W. Chastain, gen. mgr., Grand River Mutual Tel. Corp., announced completion of dial cutover at Mt. Moriah, Mo. . . . Bruce Burr, sec.-treas. & acting mgr., South Central Utah Tel. Assoc., Richfield, Utah, reports completion of $340,000 program to bring improved service to Koosharem, Antimony, Boulder, Henrieville, Escalante, Tropic, Cannonville, Orderville, Mt. Carmel & Glendale.

Floyd L. Reyher, pres., Haxtun (Colo.) Tel. Co., reports company will complete $300,000 dial conversion by May . . . Paul Henry, mgr., Illinois Consolidated Tel. Co., Hillsboro, announced completion of program to bring dial service to Hillsboro, Irving and Butler . . . General Tel. Co. of the S. W. will convert Weslaco, Tex. exchange to dial. Estimated cost is $300,000 . . . J. R. Hollis, owner of Hinton (Okla.) Tel. Co. reports company has applied for REA loan.

Pioneer Suburban Tel. Co. completed installation of dial equipment to serve St. Michael & Albertville, Minn. . . . Glenn Waterson, pres., Southern Tel. Co., Brooklyn, Mich., announced $400,000 dial conversion program . . . Joe M. Roberts, pres., Bolivar (Mo.) Tel. Co., reports awarding of $59,070 central office equipment contract for new Bolivar dial system. Cutover is scheduled for Dec., 1956.

Pat J. Carey, owner of the Petersburg (Neb.) Tel. Assoc., has been elected pres. of Nebraska Tel. Assoc. Nebraska association board also elected Wm. T. Autry, pres. of the Nebraska Continental Tel. Co., Columbus, as vice pres., and appointed Robert C. Hunt, Blair, Neb., to board to fill unexpired term of the late Vernon F. Bellows . . . Le Roy Jones, Emerson, Neb., named mgr., Northeast Nebraska Tel. Co. . . . Howard Garrison has been named auditor of Grand River Mutual Tel. Co., Princeton, Mo. . . . L. R. Martine has been elected pres. High Point (Mo.) Tel. Co. Other officers are: C. R. Medlen, v. p.; A. W. Jobe, sec.; E. M. Snyder, treas. . . . Zenda (Kans.) Tel. Co. granted charter. Woodrow Graber is residence agent.

Died: Fred S. Bishop, 68, supt. of equip., Richmond (Ind.) Home Tel. Co. . . . Ralph G. Geniesse, 54, div'n plant mgr., Wisconsin Tel. Co., Appleton, Wis.

WASHINGTON NEWSLETTER

COMPLAINT DISMISSED

The series of telephone foreign attachment cases which the Federal Communications Commission had before it in the early postwar years has finally drawn to a close with Commission decision of the six-year-old Hush-A-Phone proceeding. The FCC disposed of the Hush-A-Phone case, number one on the monthly list of long-time pending cases which it must submit to Congress, by dismissing the complaint of the Hush-A-Phone Corp. against the telephone companies' tariff provisions barring foreign attachments.

As an almost totally different Commission ruled nearly five years ago in the initial decision, the FCC's final verdict was that the use of the Hush-A-Phone "adversely affects" telephone service, and that it is "necessary and proper" that the telephone companies control the use of foreign attachments. Hearings in the case were held Jan. 17-26, 1950. The February, 1951, initial decision was followed by oral argument before the full Commission in November, 1951 — the last the matter was heard of until the final decision was issued at the close of 1955.

At the time Hush-A-Phone filed its exceptions to the initial decision in mid-1951, Hush-A-Phone Corp. President Harry C. Tuttle said he and the company would have no alternative "but to continue pursuit of their purpose to establish the rights of the telephone subscribers," but there was no immediate indication after the FCC final decision as to whether litigation would result.

In its decision, the FCC held that "Inasmuch as the unrestricted use of foreign attachments by the public may result in impairment to the quality and efficiency of telephone service, damage to telephone plant and facilities, or injury to telephone company personnel, it is necessary and proper that the use of foreign attachments be subject to control by the (telephone companies) through reasonable tariff regulations."

The Commission commented, "It appears that the use of the Hush-A-Phone device affords some measure of privacy as well as a more quiet telephone wire by reason of exclusion of surrounding noise, and that no physical damage of any consequence results to (telephone) facilities when the Hush-A-Phone is used. But it is clear from the record that the use of the Hush-A-Phone for the primary purpose for which it was designed, to wit: privacy, is accompanied by an impairment in the quality of telephone transmission. As shown by our findings of fact, the use of the Hush-A-Phone results in a number of effects upon the telephone circuit: a slight loss in intelligibility when used in ordinary conversation, and a greater loss of intelligibility when used with the objective of obtaining privacy."

Other Commission proceedings, decided much earlier, involved recording devices, and automatic telephone answering and recording units. The FCC permitted use of recording devices when physically connected by a recorder-connector, emitting a "beep" warning, supplied by the telephone companies, and authorized use of automatic answering and recording units when authorized by the appropriate state commission, on the grounds that their use would be primarily in intrastate traffic.

NO OPPOSITION

What had been one of the FCC's most controversial telephone acquisition cases, involving the proposal of the Southwestern Bell Telephone Co. to buy the Tomball, Tex., Telephone Co. for an agreed-on $200,000, apparently ended quietly at a rehearing before a Commission examiner at which no opposition was expressed. The US Independent Telephone Association, which had intervened in opposition to the sale, was represented by counsel but did not participate actively in the rehearing, while the Texas Telephone Association, which also opposed the transaction at the first hearings, withdrew from the case.

After the first hearings were held in February, the FCC Common Carrier Bureau opposed approval of the transaction on the ground that the purchase price was excessive, and that sufficient benefits to Tomball telephone customers had not been demonstrated. Examiner H. Gifford Irion in his initial decision agreed with these conclusions, but the FCC later, at Southwestern Bell request, remanded the case to Mr. Irion for rehearing after the Bell company stated it had additional evidence to present. ***(Continued on Page 8-F)***

BAKELITE POLYETHYLENE

TRADE-MARK

MEETS VARIED FIELD CONDITIONS IN TESTS CONDUCTED BY GENERAL TELEPHONE COMPANIES

In just ten years, General Telephone System has tripled its number of telephones in service. It now serves in 30 states spread across the continent. Much of this progress has been matched by increased efficiency through the use of new equipment, devices, and materials.

As an example of this forward planning, several member companies of General Telephone System are testing wire and cable covered with BAKELITE Brand Polyethylene in various sections of the United States. This exposure to different climatic, geographical, and operating conditions points up advantages of BAKELITE Polyethylene for telephone services as indicated in the test reports in the adjoining pages.

FIELD TESTS DEMONSTRATE PROP

BAKELITE POLYETHYLENE OF INT

FIELD REPORT FROM SPOKANE, WASHINGTON

Polyethylene-covered cable was first installed here in 1950.

Field experience showed that it was adaptable to any method of hanging and required no special equipment. Installation could be made on existing pole arms without increasing crossarms, pole height, or tree trimming.

No outside interference is apparent with polyethylene-covered wire although installations have been made near power lines and open wire.

The line has withstood extremely heavy snow and ice loading in certain mountain and valley sections. There has been no deterioration despite temperatures 40 deg. below zero.

During the summer months, temperatures up to 115 deg. and exposure to sunlight have had no discernible effect.

FIELD REPORT FROM JOHNSTOWN, NEW YORK

Most of the rural service in this section has been carried over conventional open wire lines. To increase the number of telephones, it was necessary to add more crossarms which in turn brought higher maintenance costs due to tree trimming. Also, open wires were susceptible to damage by wind, ice, and lightning.

Recently, 33,000 feet of cable and 75,000 feet of rural distribution wire, both insulated with polyethylene, were put into service. Although an unusually large number of thunderstorms were experienced during the year, no lightning damage was reported on these lines. To date, rain conditions have had no effect on any of these cables.

Much of the polyethylene cable was strung on existing poles, but in the construction of new lines it was found practical to use ⅓ fewer poles. The need for crossarms and tree trimming was also reduced.

OPERTIES AND CHARACTERISTICS OF

NTEREST TO TELEPHONE ENGINEERS

FIELD REPORT FROM ERIE, PENNSYLVANIA

Polyethylene has stood up under exhaustive indoor and outdoor tests carried out in this region during the past year. It has effected such savings in installation costs that it will be a major item in purchases for the coming year.

Polyethylene-covered wire is already being used in rural areas, where the need for 6-pair distribution wire has been a continual problem.

With respect to service life and safety, polyethylene is considered an outstanding improvement over other materials. It has shown unusual resistance to weather and abrasion.

The extremely light weight of polyethylene insulation permits a smaller cable construction that is easier to handle, making for faster installations. It also permits wider pole spans, with a consequent saving in poles and maintenance.

FIELD REPORT FROM SPRINGFIELD, ILLINOIS

Cable with polyethylene insulation and vinyl plastic jacketing has been used in this area since 1953. Its light weight, compared to that of conventional cable, has resulted in several economies, including a 5-ft. reduction in pole height, elimination of guy wires and messengers, faster handling of cable, less land clearing, and wider spacing of poles.

Excellent results are reported with spans of 400 feet, compared to the 240-ft. spans needed with conventional cable. The light weight and high strength of the cable assembly are particularly important in winter, lessening damage from ice and sleet loading.

Because of its high dielectric strength, polyethylene now replaces fabric insulation on circuit wiring. Tests on the cellular form of polyethylene indicate the possibility of using 26-gauge conductors where 24-gauge are now considered necessary.

DIS

yl plastic
1953. Its
nal cable,
ng a 5-ft.
uy wires
less land

s of 400
vith con-
strength
ortant in
loading.
olyethyl-
t wiring.
indicate
rs where

BAKELITE
TRADE-MARK

POLYETHYLENE

THE INSULATION FOR DEPENDABLE SERVICE EVERYWHERE

From East Coast to West, from the Gulf to the Great Lakes, member companies of General Telephone System across the country are subjecting BAKELITE Brand Polyethylene to service under a variety of tough field conditions.

The dependability of BAKELITE Polyethylene insulation for wire and cable has already been demonstrated in other fields . . for *control cables* in the operation of fire alarm, traffic, and railway signals . . in *utility line wire* and *service drop cable* . . . in *power cable* . and in *coaxial cable* for high-frequency service.

Field tests such as those described on the preceding pages demonstrate how BAKELITE Polyethylene can help in expanding and improving telephone service. To learn more about it, write Dept. MN-180.

BAKELITE
BRAND
Polyethylene Plastic

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 E. 42nd St., New York 17, N. Y.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario
The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

WASHINGTON NEWSLETTER

(Concluded From Page 8-A)

Following the most recent hearings, the Common Carrier Bureau withdrew its opposition. Its statement said the record still shows the price to be paid "exceeds the net book value of the plant to be acquired. However, in view of the stipulation that such excess will never be advanced as a basis for rate-making, and since the record now shows service advantages to the public from the proposed acquisition sufficient to outweigh any adverse implications of the purchase price," the bureau does not intend to file any further statements, and "no longer objects to the issuance of the requested certificate."

At the hearings last month, specific plans for improvement of Tomball telephone service, and appraisals indicating value of the property at figures greater than the proposed $200,000 purchase price, were offered by Southwestern Bell. The company's testimony was aimed at clearing up points raised by Mr. Irion's initial decision. Company witnesses testified to the Tomball firm's present service shortcomings, and said Southwestern Bell will clear up backed-up demand in the city service area in six months and throughout the Tomball company's territory in a year. If it takes over the property, Southwestern Bell will spend an estimated $185,000 on construction in the area in a year, they reported.

John E. McCauley, Partner in the Chicago consulting engineering firm of Sloan, Cook & Lowe, told the hearing he appraised the property at $243,783 reproduction cost and $195,557 cost less depreciation, as of April 30. Because of cost increases, the figures today would be at least 10 per cent higher, he declared. J. Ben Blanton, Texas area Inventory & Cost Engineer for Southwestern Bell, set the reproduction cost of the Tomball property, as of Oct. 31, at $254,887, and the current cost less depreciation, or structural value, at $211,793. Both appraisers said the property is a good buy at $200,000.

Several Tomball organizations had intervened in the case in favor of the acquisition, and a petition signed by 70 residents of the town was offered.

POSSIBLE SALE

The Civil Aeronautics Administration is studying the feasibility of selling terminal equipment required in its four leased telecommunications networks to private firms and then leasing back the facilities, if such a step should prove economical, but it will be another six months before a decision is reached, CAA Administrator Charles J. Lowen has announced.

Mr. Lowen's comment came a day after Rep. Robert H. Mollohan (D., W. Va.), issued a statement which inferred that the recent departure of Frederick B. Lee as head of CAA may have been due in part to Mr. Lee's opposition to proposals that CAA sell the terminal equipment and enter into a leasing arrangement.

Releasing portions of a letter Mr. Lee wrote to him in October, Rep. Mollohan said it appears from the letter that "the Department of Commerce is intent on turning over CAA's teletypewriter communications system to private companies."

Mr. Lee's firing has aroused considerable protest, and Senator A. S. Mike Monroney (D., Okla.), who heads the Interstate & Foreign Commerce aviation subcommittee, has announced an investigation of the subject and a proposal to divorce CAA from Commerce and make it a separate agency.

While Rep. Mollohan's statement referred to the "communications system," CAA pointed out in its reply that the disposition of terminal equipment only is under consideration. Landline facilities have been leased for a long period of time from the American Telephone & Telegraph Co. and the Western Union Telegraph Co. for the CAA meteorological, domestic flight plan, and overseas flight plan information services.

"VOLUME RATE"

A six-month postponement of the effective date of its "volume rate" multiple channel private line tariffs, from the previous Feb. 1 suspension deadline until Aug. 1, was agreed to by the American Telephone & Telegraph Co. Long Lines Department in a letter to the FCC attorneys working on the Commission's current investigation of the tariffs.

REA ASSISTANCE

The Rural Electrification Administration "will consider applications for loans necessary to finance the required facilities for Air Force SAGE operations in their territories," Deputy Administrator Fred H. Strong has advised all REA telephone borrowers. Mr. Strong also pointed out that "REA is ready to provide technical advice and counsel regarding the SAGE system."

Expansion of the SAGE (semi-automatic ground environment) system of air defense will require "extensive communication circuits and related equipment to be provided by the telephone company serving the areas involved," the REA borrowers were advised. "The general policy which has been agreed upon is that the company serving the territory in which the facilities are to be located has the responsibility of providing the facilities required by the SAGE project. The Bell companies and Western Electric have indicated they will cooperate in every possible way, particularly in providing counsel and technical advice. In some cases, it may be necessary for the REA borrower to contract certain technical work with an equipment manufacturer or a Bell company."—***By the Editors of "Telecommunications Reports."***

Suitcase-size system . . . but a big revenue builder!

This 2-trunk, multi-station system gives big service to small businesses.

Two central office trunks and six internal stations may be just what your small commercial subscribers are looking for!

That's the capacity of the Stromberg-Carlson 2-6 Convenience System. And it's proving itself a real revenue builder, with its handy push button simplicity.

You can make internal calls and trunk calls, and you can hold a trunk call, all on any telephone in this system. Also, you can have secret service for both trunks of one station, or one trunk for two stations.

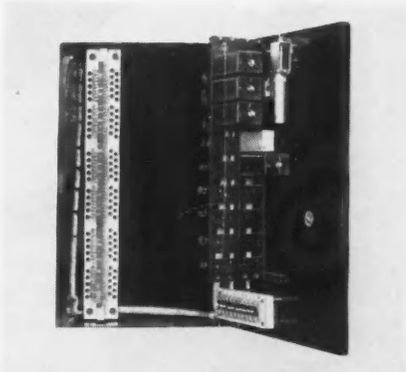
It's easy to install and keep running, too! Relays in the cabinet are arranged for easy inspection, adjustment or testing. Terminals are screw-type for easy installing.

OTHER TYPES, TOO

The 2-6 System is one of a number of Stromberg-Carlson convenience systems, all designed to meet the special needs of the smaller commercial subscriber.

The 2-10 System is, as its designation suggests, a slightly larger system providing 2 trunks, 10 stations. Other systems in the series: 1-7, 3-5, 7-6 (in connection with a PBX switchboard), 2-M-6 (for magneto areas), 1-11, 3-9, 2-M-10 (magneto), and the 2-10-ST and 3-9-ST systems (selective talking).

For more details, call your Stromberg-Carlson office.



When relay cabinet opens, all equipment is "up front."

COMPONENTS OF 2-6 SYSTEM:
(1) 2 central office trunks, (2) relay cabinet, only 18" x 10" x 6", (3) terminal box, (4) bell box, containing a Hi and a Lo gong, (5) No. 1270 push button telephone.

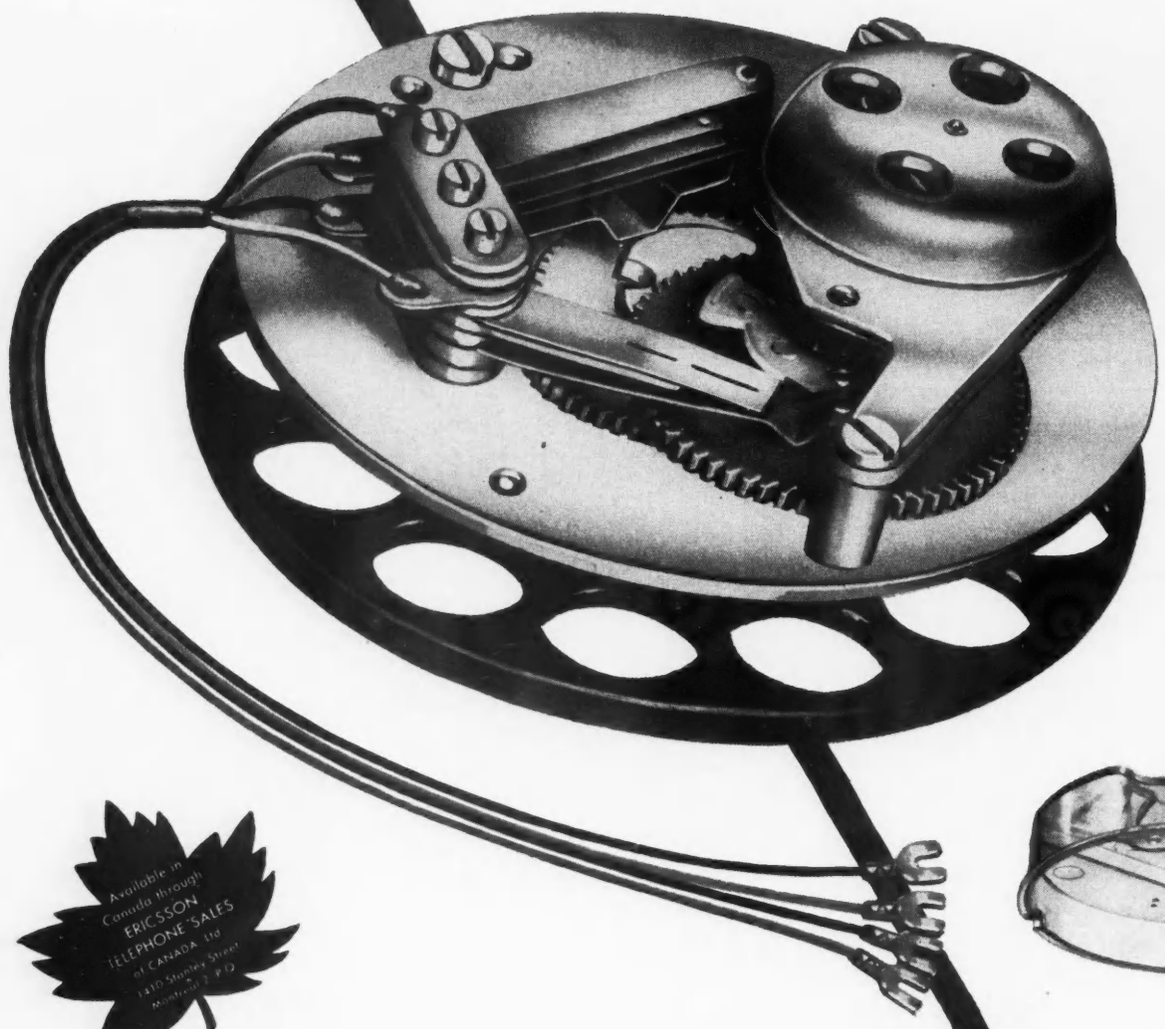
STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

Rochester 3, New York

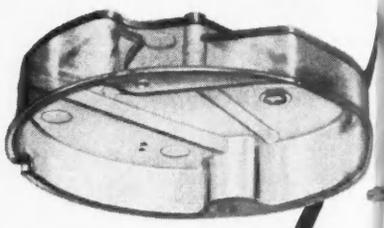
EVERYTHING

a modern dial should



North's new extended number plate is designed, in contour and finish, to prevent glare and to resist wear. Clear, sharp lettering in straight-line groups also helps to make this the fastest-reading, easiest-to-use of all modern dials.

On all standard North dials a snug plastic cover protects the mechanism from dust and dampness. It is transparent for quick visual inspection and is easily removable.

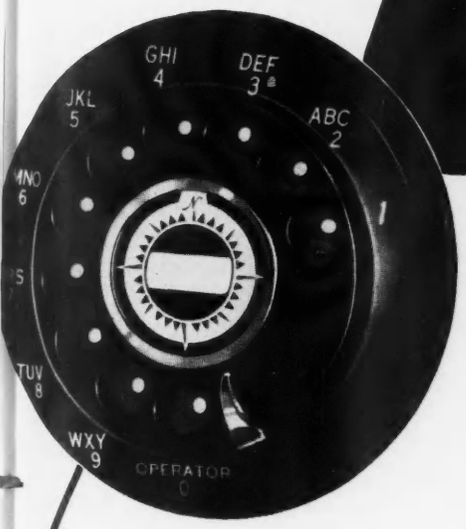


Available in Canada through ERICSSON TELEPHONE SALES of CANADA Ltd 5410 Stanley Street Montreal 2, P.Q.

ASK FOR BULLETIN T-542
describing North Telephones and Dials

NORTH

cost-saving long-lasting smooth and quiet adaptable



The experience of users proves that the new North N-541 Dial outlasts any other they have used, ***and with less attention.*** If your labor costs compare to the industry average you spend just about the original dial price every time you send a man to adjust or replace a dial on the job. North dials pay for themselves by "staying put" *without* repeated service calls.

There is no mystery about such performance. It is based upon advanced mechanical features of the North design. Specifically...

SMOOTH ACTION results from the extra-large diameter governor in which the braking shoes lead *into* the drum. This provides a more positively controlled revolution of the dial than is possible with the "drag" effect of other governors.

QUIET NON-STICK GEAR TRAIN has no worm gears. Its action is so free that it absorbs very little of the reserve driving power in the dial. Gear whine is eliminated. No "thump" at the end of the spin.

CONSTANT PULSING is assured throughout the life of the dial. Both the pulsing and the off-normal springs have double contact points.

SPEED ADJUSTMENT is simplified and once set will not change.

ADAPTABLE: North Dials can be fitted to all standard telephones, tollboards and other operator stations. They make excellent replacements for dials of any type.

You can benefit from the sort of savings now being enjoyed by other cost-conscious telephone companies by standardizing on

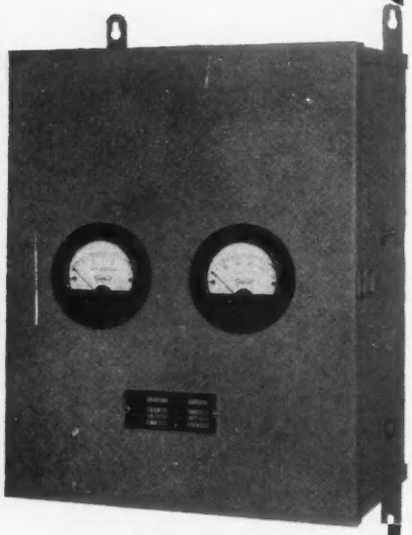
NORTH DIALS

NORTH ELECTRIC COMPANY

655 South Market Street, Galion, Ohio

Dependable Power

for Years-
and Years-
and Years-
of Service!



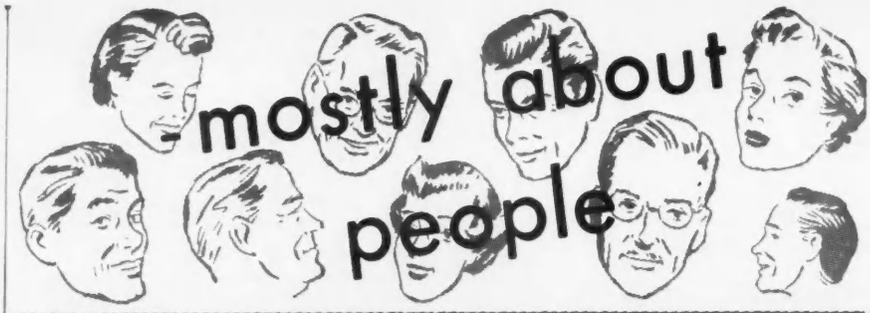
Schauer
ELECTROX
BATTERY ELIMINATORS
BATTERY CHARGERS

In sizes and capacities to meet every telephone power requirement.

See your Schauer Jobber.
Write for Bulletin 4516.

RECTIFIER DIVISION
SCHAUER
MANUFACTURING CORP.

4516 Alpine Ave., Cincinnati 36, Ohio



ACROSS THE EDITOR'S DESK

Telephone Directories

THANKS TO CARL BROREIN, president and general manager of the Peninsular Telephone Co., Tampa, Fla., a few extra copies of "Speaking of Telephone Directories" are available to interested Independent telephone men. The booklet was prepared by the St. Petersburg Printing Co. and presents a graphical picture of the growth and development of the Peninsular system from 1947-1955.

The printing company prints all of the directories (283,000 every six months) and this study and presentation indicates rather accurately the growth of telephone usage by exchange, county areas and total area through the increase in number of directories published and the pages in the alphabetical and classified directory by exchange, by county and consolidated for the entire area. It also provides a means of a satisfactory measure of population growth. Mr. Brorein will send you a copy as long as his supply lasts.

■ ■ ■

"Telco News"

CONGRATULATIONS to the Capital City Telephone Co., Jefferson City, Mo., and to *Jim McHenry* in particular on the company's newsletter TELCO NEWS. The first issue is well presented and attractively illustrated with drawings by an employe of the company. To date Capital City has had a gain of 663 stations during the first 11 months of 1955. It has been highly successful in its merchandising campaign this year with a score for individuals selling 257 Koiled Kords, 22 extensions, 39 colored telephones and 24 two-line handsets. Jim McHenry is the editor.

■ ■ ■

Arkansas Story

MRS. VIRGINIA HIRSCH, Mountain Home, Arkansas, is one of the few successful operating telephone ladies in our industry. In mid-November she was the subject of feature stories in Arkansas newspapers when her new microwave system was put into service as the first microwave installation in the state. The system originates from the dial system at Lakeview and extends to two communities across two arms of Bull Shoals Lake where it would have been impossible to build into and maintain with regular facilities. It is expected the microwave portion will reach its potential in two years or less.

■ ■ ■

A Chicken Dinner

BUSINESS kept us away from Alger Mich., last month. But we would have liked to visit the Alger Associated Telephone Co., and had our share of the chicken served by the ladies of the Methodist Church at the dinner celebrating the first complete year of operation for Alger's new dial system.

The number of telephones in service during the past year has increased from 43 to 71 or 65.1 per cent; the number of shareholders from 69 to 108 or 56.5 per cent; and the number of shares of ($10 par) common stock issued from 1080 to 1457, an increase of approximately 35 per cent.

When dial service was inaugurated last year on November 4, the company owed to Independent manufacturers and suppliers approximately $3500. Today the company is completely out of debt.

The outstanding achievement of this newly formed Michigan Corporation is a great tribute not only to the customers, stockholders, and management of the Alger Associated Telephone Co., but is symbolic of what can be accomplished through the free enterprise system of business practiced under the American way of life.

Your customers can hear better over Copperweld TRADE MARK LINE WIRE

Most everyone thinks of Copperweld* Line Wire in terms of its excellent tensile strength and corrosion resistance. So far, so good.

But, never forget that Copperweld has far better talking qualities than any other high-strength conductor. This makes it the best engineered wire for subscriber loops and toll lines. What's more, Copperweld is the only long-span conductor suitable for carrier systems.

TWO POPULAR SIZES

.104"-40 High Strength for toll lines and long subscriber loops.

.080"-30 Extra High Strength for short subscriber loops and secondary toll lines.

*Trade Mark

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION
Glassport, Pa.
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

SOLD BY LEADING DISTRIBUTORS

Conserve

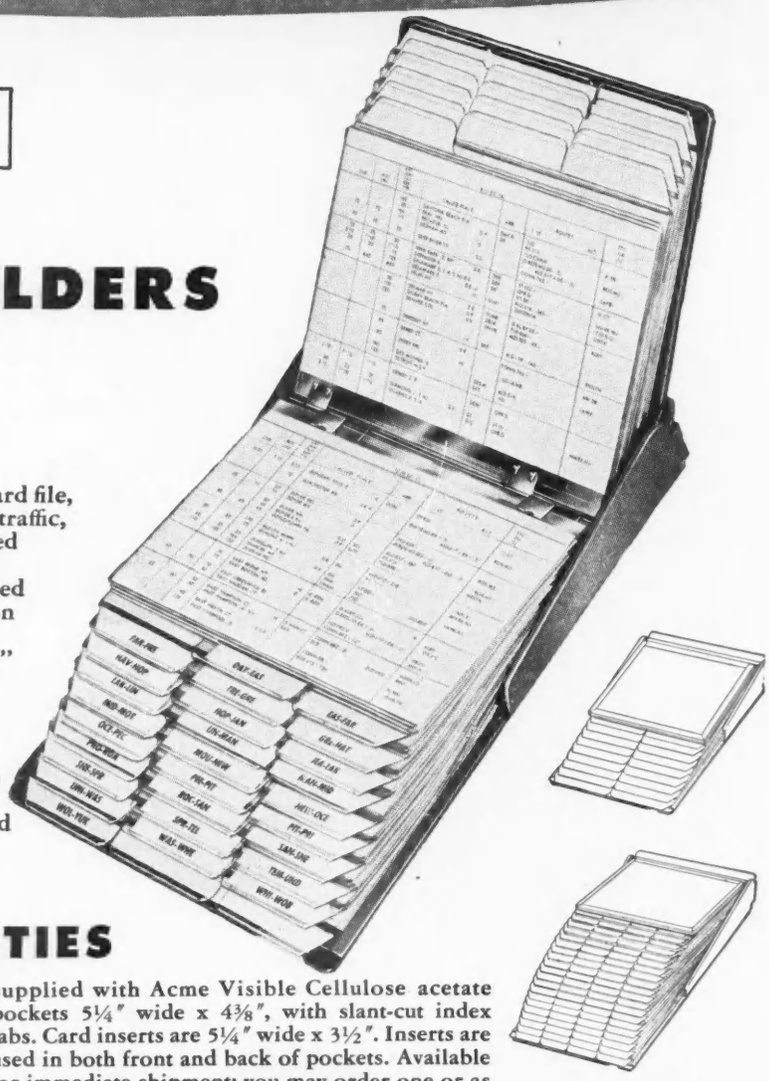
CIRCUIT TIME
OVERTAXED FACILITIES
OPERATING FORCE

REDUCE COST OF OPERATION • IMPROVE CUSTOMER SERVICE

with

ACME VISIBLE

MULTI-CARD BULLETIN HOLDERS for Long Distance Inter-Toll Dialing



One operator with her individual Routing Multi-Card file, containing over 95% of the routes for originating traffic, can do the job faster and more efficiently.—No need to bring in a second operator.—No guess work; routes are before her—*visible.*—Calls are completed quicker.—By this method of centralized provision of Routing records, more routes are available to the Central Office force. Consequently less "121" calls go over the LD circuits. With the use of the Acme Visible Multi-Card Bulletin Holders, each operator is able to determine over 95% of her routings and rates. Operator can immediately compute charges on Coin Box calls or where there has been a request for T & C. By not trunking to Rate & Route operator, less operator time is needed at these positions.

3 SIZES • 9 CAPACITIES

Acme Multi-Bulletin holders are carried in stock in 3 sizes—with 10, 15 or 20 hangers. Each unit is available with 2, 3 or 4 pockets per hanger to provide a wide range of capacities for listing towns frequently called—from 720 to 2,880 listings using 6 lines to the inch and from 960 to 3,840 listings using 8 lines to the inch. They are supplied with Acme Visible Cellulose acetate pockets 5¼" wide x 4⅜", with slant-cut index tabs. Card inserts are 5¼" wide x 3½". Inserts are used in both front and back of pockets. Available for immediate shipment; you may order one or as many as you need at a time. Units are supplied complete with insert cards and labels for index tabs.

ACME VISIBLE RECORDS, INC. CROZET, VIRGINIA

District Offices and Representatives in Principal Cities

ACME VISIBLE RECORDS, INC., Telephone System Division, Crozet, Virginia

Please send us illustrated booklet

☐ #994 on Acme Multi-Card Bulletin Holders ☐ #982 on Acme Flexoline for Telephone Companies

☐ Have representative call. Date..... Time.....

☐ We are interested in Acme Visible equipment for ..... records.
KIND OF RECORD

Company..... Attention.....

Address.....

City..... Zone..... State.....

Here are two informative booklets illustrating and describing various units which have been designed for, and use-tested by, telephone companies throughout the country.

Send for your copies today!

MANAGEMENT NEWSLETTER

MORE MONEY

A sizable shift in income brackets — with the poor getting fewer — has been important in the spurt of buying which reached its peak in '55. The $5000 to $15,000 yearly wage group of people has doubled since 1941. This represents about one third of all consumer units in the country. They had 120 billion dollars to spend. This great middle class market — the most vital in the country — breaks down according to the *U. S. News and World Report* this way: 11,640,000 people in the $5000 to $7500 range, up 57 per cent since 1951; 3,359,000 people in the $7500 to $10,000 range, up 92 per cent since 1941; 1,921,000 people in the $10,000 to $15,000 range, up 103 per cent since 1941 (income after Federal taxes and adjusted to today's prices).

HOUSING

Housing's hot as a topic in government circles. Commissioner Norman Mason of the Federal Housing Administration says that curbs on mortgage credit will be loosened if home building drops further. First step would be to bring back better maturities which were pared from 30 to 25 years in July. Next step might be relaxation of rates on down payments which were upped two per cent at the same time. Albert M. Cole, administrator of the Housing and Home Finance Agency feels builders must start 1,200,000 new homes next year. The Commerce and Labor Departments concur in this.

Many forces work to sustain and increase the housing demand in the year ahead. Miles Colean, home building economist, points to significant ones in *House & Home*:

Family income rising fast. Number of families who can afford to buy a house are increasing perhaps twice as fast as the total number of households.

Increased savings.

Number of marriages still high.

Migration from farms to city. (Census Bureau figures show a five year rise of 19 per cent; 45 per cent jump in rural, country home areas; 14 per cent increase in metropolitan areas in past five years.)

Migration from state to state. Five million people move across state lines each year.

Change in Negro housing market. Spectacular improvement in their incomes; migration from farm and small town to cities.

More demolitions resulting from urban highway programs and slum elimination.

Technological changes. Striking changes in style, conveniences in homes which create dissatisfaction with old houses.

NEWS IN THE MAKING

You'll be hearing more about growing U. S. population and its effect on telephone demand. Statisticians tell us a new customer is created every 12 seconds. Births are beating the high of 4,100,000 established in '54 and marriages are up in the past five years. Census Bureau estimates 69.9 per cent of U. S. males over 14 are now married. Five years ago this figure was 68.2 per cent.

Demand for telephone service for mobile homes will continue. Here's why: more homes are taking to the road. Sales of mobile homes during the first 9 months of '55 were $324,586,000 — up 34 per cent over '54. There were 75,980 units sold in 9 months of '55 compared to 56,667 in '54.

Give-and-take bargaining on supplemental unemployment compensation is expected to develop next year in several major industries. The unions are expected to seek plans which would represent a liberalization of the Ford-type supplemental unemployment benefit plan, which calls for company contributions of five cents an hour into a pooled fund. They are likely to reject, in the initial bargaining at least, employer offers of "income security plans." Employers appear to be showing greater interest in selling unions on the advantages of income security plans, under which company contributions of so many cents per hour are paid into individual accounts maintained for each employe.

A full-fledged boom for closed-circuit television in industry and education is predicted for 1956 by James L. Lahey, gen. mgr., Dage Television Division, Thompson Products, Inc., Michigan City, Ind., manufacturer of closed-circuit TV equipment. Judging from present market indications, Lahey believes there will be "at least 5,000" closed-circuit TV installations made by the end of 1956, as compared to only 1,500 made to date.

MANAGEMENT NEWSLETTER

(Concluded From Page 15)

He said tremendous strides can be expected from Data-Vision, Dage's new system of transmitting television images over ordinary telephone lines, which is being experimented with by Bell Telephone Company subsidiaries and Independent telephone companies.

Many informed persons in the copper industry are expecting there will be a balance between supply and demand of copper during 1st quarter of '56. According to T. E. Veltfort, mgr., Copper & Brass Research Association, a few people believe there may be slight surplus of supply over demand by middle of '56. These predictions are predicated on assumption there will be no serious strikes or other interruptions in production, such as occurred during past two years. This optimistic outlook is based on fact that increased supplies of copper are expected to become available early in '56. Development of new mining properties and expansion of existing mines — projects that require years rather than months — will bring an increasing amount of copper to the market. It is expected this copper output will increase month by month at least for the next three years.

SPA FOR BUSINESSMEN

Aspen, Colorado, where jaded minds have been revitalized by healthy doses of cultural and intellectual stimulation, will soon be reconditioning fatigued physiques, as well. Starting in March, the Aspen Health Center will offer a 2-week physical therapy program for overworked business executives. The aim is to prevent, rather than cure, breakdowns on the premise that "the average American is so busy with the urgent that he has never time for the important."

"PHONES FOR CHILDREN"

Talkative teen-agers are ringing up new sales for telephone companies as more parents have private telephones installed for their children. A "very substantial increase" in the number of children's telephone listings in the Chicago area is noted by Illinois Bell Tel. Co. as a result of an intensive merchandising campaign. Though no separate statistics are kept, the company estimates about 500 youth telephones have been installed since their debut after World War II. Highland Park, a North Shore suburb of 20,000 people, has more than 100 children's telephones listed, about double the number a year ago.

Not extensions, the telephones have their own private lines, numbers and bills — which parents usually pay. Chicago directories list them under parents' names as "child's telephone" or "son's" or "daughter's." In many cities, such as New York, the listings must be under the child's name. The New York Tel. Co. agrees that "kids' phones," while only a small percent of total telephones, are growing in number.

Illinois Bell says it is pushing telephones for the younger set as part of its merchandising campaign, not just as a conversation piece. This campaign, incidentally, resulted in 78,000 extension telephones being installed in the firm's area in 1955, compared with 27,000 in 1954. There's one extension telephone for every six residential telephones in Illinois Bell territory now. And color telephones are being installed at the rate of 165,000 a year in the Chicago area, compared with 27,000 last year.

HUMAN RELATIONS

The Champion Paper & Fibre Co. has a new film on human relations in industry — specifically communications — and it is available free to business, industry, and other groups.

The plot of the picture concerns production of a business film on human relations in industry and the reactions of various actors to the scenes which they play. The situations shown concern the president of a small manufacturing company who is in trouble with his employes because of poor communications. While the film doesn't offer specific answers to specific problems, it does create an awareness of the complicated and difficult nature of the entire subject. For further information write to Champion Paper & Fibre Co., Public Relations Dept., Hamilton, Ohio.

MANAGEMENT BOOKSHELF

"Oral Communication In Business," by David C. Phillips. Spoken words are the most common vehicles for transmitting thoughts; but proper word usage is another matter. In business, particularly, correct employment of oral communication is most important — in dealing with people, at conferences and sales presentations and in making speeches. Those who have trouble "getting over" their ideas orally will find in this book practical, step-by-step suggestions for improvement. Well-organized and illustrated with examples, it also contains a list of selected readings. McGraw-Hill Book Co., Inc., New York City. $3.75

"New Horizons in Business," published by Harper & Brothers, 49 E. 3rd St., New York City, is an inspiring little volume that will appeal to business men in all walks of endeavor. Seven leaders in American business, finance and research have broken through the barrier of time to draw a picture of the outlook of the American economy over the next 20 years.

"Personal Estate Planning in a Changing World," by Rene A. Wormser, 284 p., Simon & Schuster, New York City, $3.95. This is a newly revised edition of a standard book that is not a textbook but a work designed to teach the average man or woman to think of estate planning. The author sympathizes with all those persons who feel all planning is futile and that survival will depend upon an opportunistic ability to meet conditions as they develop.

Automatic's pointers for plantmen and managers

Offer "telephone answering service" with the Electronic Secretary

Businessmen in "one-man" offices—such as realtors, doctors, lawyers, radio and television repair men—will appreciate your suggestion that they install an Electronic Secretary. They *need* "someone" to answer the telephone when they're out of the office!

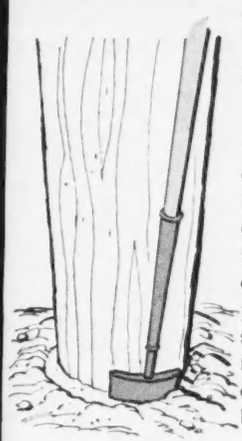
The Electronic Secretary fills this need by receiving incoming calls, and transmitting to each caller a recorded message. A smooth, pleasant voice announces that "Mr. Jones is out," that he'll be back shortly, or tells where he can be reached. It invites the calling party to leave a message, which is then faithfully recorded on wire. When Mr. Jones returns, he can learn the nature of the call by simply playing back the message.

Such a service increases the value of the telephone to your business subscribers, and boosts your revenue. Call your Automatic Electric representative today for full particulars.

A pound of prevention is worth tons of regret!

C-O-Two fire extinguishers contain precious pounds of fire-killing carbon dioxide. This pentrating gas puts out a fire before it has a chance to turn valuable equipment into ashes. The moment the carbon dioxide is released from the tank, it pushes the air aside and quickly encircles the flames. The fire, gasping for air, dies instantly. C-O-Two is harmless to equipment, gives all-around protection. Whether you prefer the lighter, 5-pound units for operators' use or the larger cylinders, make sure you have enough C-O-Two's in your offices and plants.

Cat. No.	Capacity	Each
S-4153	5 pounds	$36.50
S-4154	10 pounds	57.50
S-4155	15 pounds	65.00



The curve of this bar speeds tamping

A simple but important design makes the Dicke curved-head tamping bar one of the handiest tools for tamping dirt around the pole. Crescent-shaped, it slides down easily, packing the earth right up to the pole; fits in narrow machined-drilled holes where other bars might bind. Curved head permits a longer, 7x1-5/16 inch tamping surface—packs the dirt down faster with fewer strokes. Be prepared for pole-line construction; order curved-head tamping bars from Automatic Electric today.

Cat. No.	Length of Handle	Each
S-2349	8 feet	$10.85
S-2350	10 feet	12.55

Prices are F.O.B. Chicago and subject to change without notice.

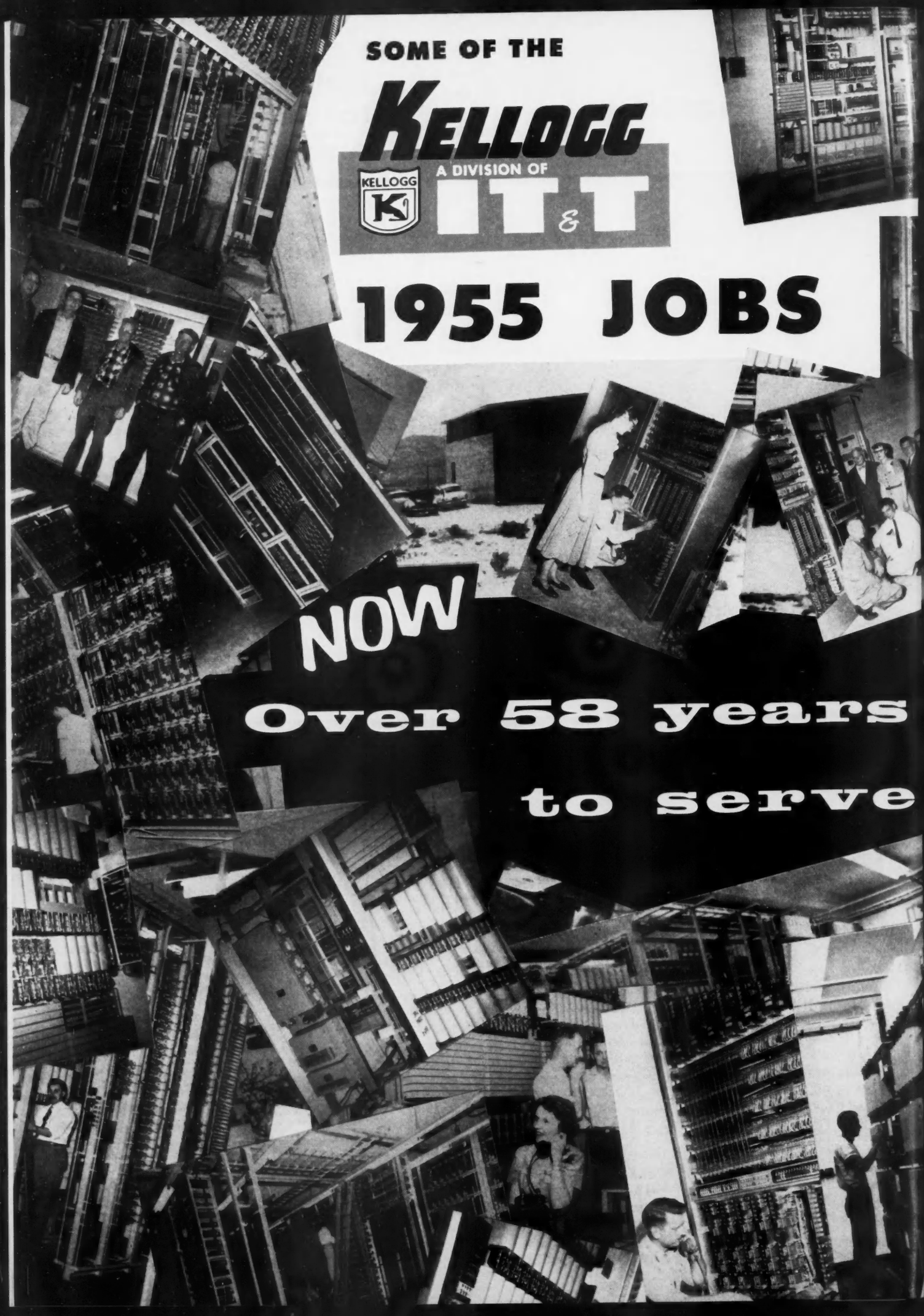
Buy Automatic's *Approved* Supplies

AUTOMATIC ELECTRIC

GENERAL SYSTEM — INDEPENDENT

ORIGINATORS OF THE DIAL TELEPHONE

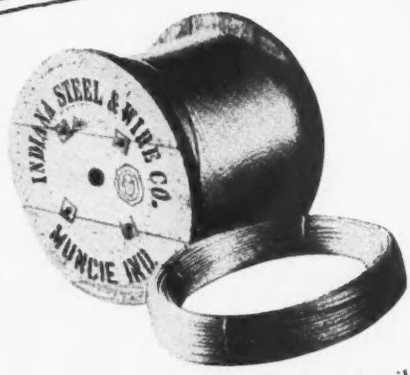
Distributors in U. S. and Possessions: Automatic Electric Sales Corporation
1033 West Van Buren Street, Chicago 7, U.S.A.


SOME OF THE
KELLOGG
A DIVISION OF
IT&T
1955 JOBS
NOW
Over 58 years
to serve

• CROSSBAR • STEP-BY-STEP
• RELAYMATIC • ROTARY
s of experience
e you better

CHECK THE ADVANTAGES AND YOU WILL

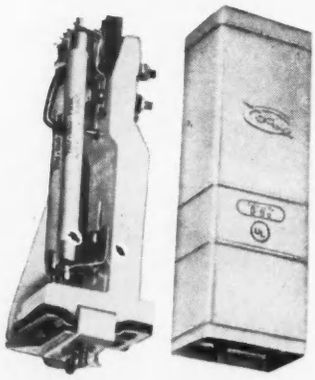
VOTE for line supplies from KELLOGG



The Time-Tested Steel Strand. A ductile, adherent zinc coating applied by the famous Crapo Galvanizing Process, provides lasting protection against corrosion in INDIANA STEEL & WIRE CO.'s Crapo Steel Strand. Minimum maintenance expense.

A Tree Guard made of thermoplastic tubing, helically slit, and cut to three foot lengths — protects drop wire from abrasion where tree contacts are unavoidable. Guard can be spiraled on wire already in place. DETROIT MACOID CORPORATION.

Exchange, Quadded and Composite: Type 775-P for Aerial and Duct Service, Type 775-AP Armored for Direct Burial, Type 775-P-SS Self-Supporting using Channell Supports, Type 2094 to REA Spec. PE-14. Rural Distribution Cable. ANSONIA WIRE & CABLE COMPANY.



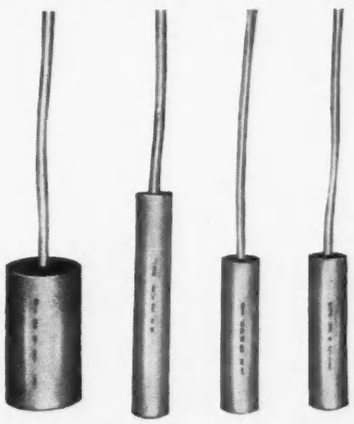
A Single Circuit Protector for both indoor and outdoor use. The Type 09U is equipped with Tru-Gap dischargers, carbons, 7 amp. fuses, a porcelain base and a gasket and locking device. A product of COOK ELECTRIC COMPANY.

Here's the Kellogg Platform!

- Top-quality line supplies
- Quick delivery
- Experienced telephone men handle your order
- All your needs from one source

KELLOGG
A DIVISION OF I T & T

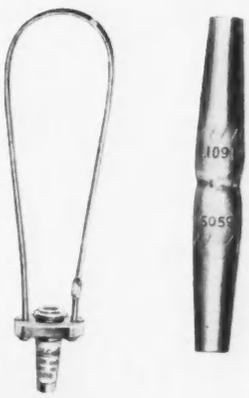
KELLOGG SWITCHBOARD AND SUPPLY COMPANY
A Division of International Telephone and Telegraph Corporation
Sales Offices: 79 W. Monroe St., Chicago 3, Ill.



Application of Loading Coils on telephone circuits, reduces loss to 1/3 or 1/4 the non-loaded value — coils shown are used on a 2-wire telephone circuit in non-quadded paper insulated or plastic cable. COMMUNICATION EQUIP. & ENGRG. CO.

H-5 Subcycle for Harmonic Ringing Frequencies. Produces all frequencies in harmonic series, 16-2/3, 25, 33-1/3, 50 and 66-2/3 cycles. Ringing frequencies locked to AC line frequency. Maintenance-free operation. LORAIN PRODUCTS CORPORATION.

Outstanding Battery Performance is yours when you choose Gould Plante Batteries. Thick, grooved pure lead positive plates give many years of trouble-free service! Made by GOULD-NATIONAL BATTERIES, INC. They're the finest money can buy.



Wirelink and Wirevise —An automatic type splice and dead-end for steel wire. Especially adapted to .109 extra high strength steel messenger supporting 5 and 6 pair Rural Distribution Cable. Easy to assemble around insulator spools and thru thimble eye. Made by RELIABLE ELECTRIC CO.

KELLOGG Branch Warehouses and Offices:

6000 W. 51st Street
Chicago 38, Illinois
REliance 5-5445

4501 Truman Road
Kansas City 1, Missouri
Humboldt 7085

410 N. Syndicate Avenue
St. Paul 4, Minnesota
Nestor 5878

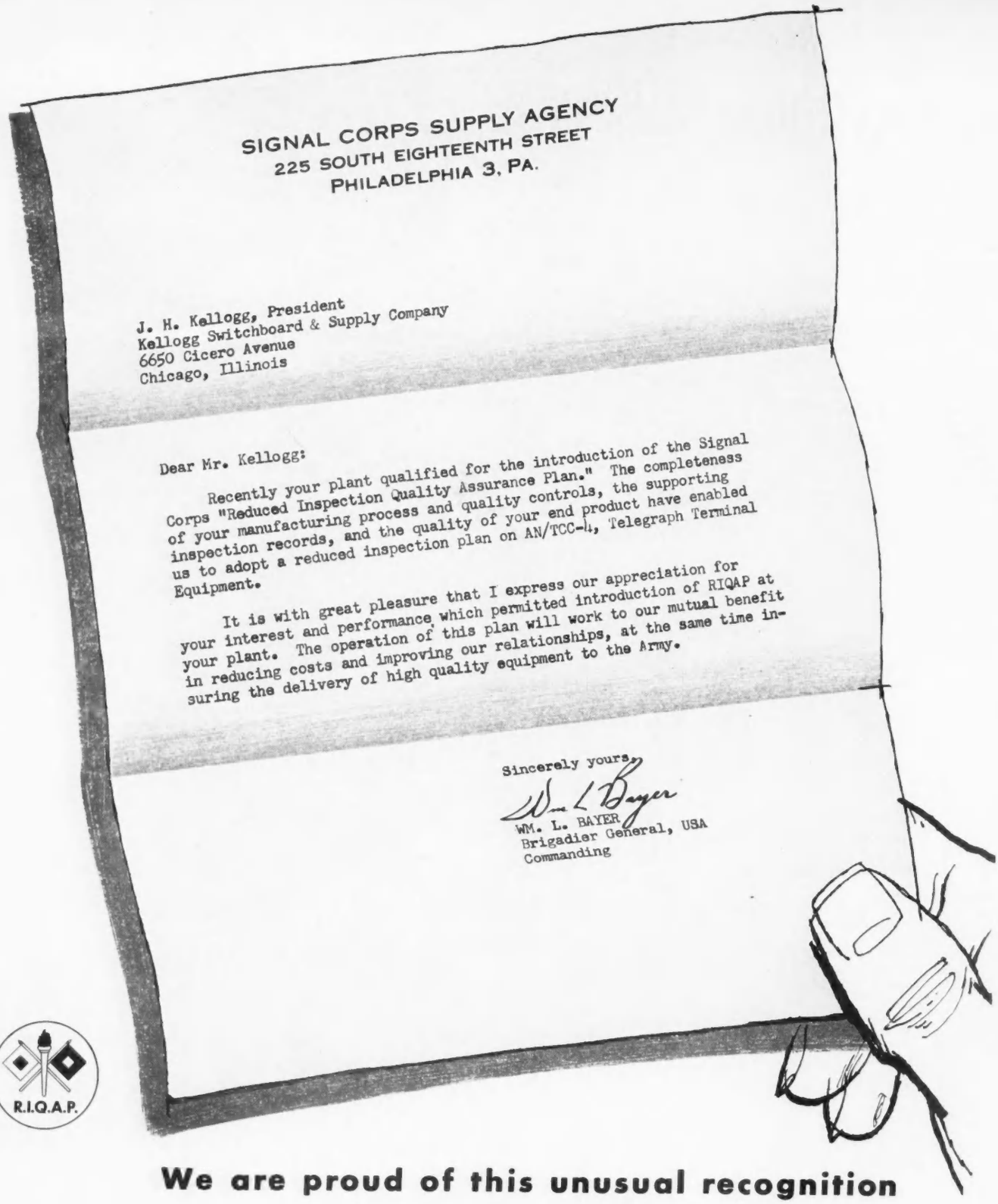
1515 Turtle Creek Blvd.
Dallas 2, Texas
Prospect 5191

1663 Mission Street
San Francisco 3, California
Market 1-6011

1555 West Fourth Street
Mansfield, Ohio
Mansfield 7-2816

KELLOGG Branch Office:

406 S. Main Street
Los Angeles 13, Calif.



SIGNAL CORPS SUPPLY AGENCY
225 SOUTH EIGHTEENTH STREET
PHILADELPHIA 3, PA.

J. H. Kellogg, President
Kellogg Switchboard & Supply Company
6650 Cicero Avenue
Chicago, Illinois

Dear Mr. Kellogg:

Recently your plant qualified for the introduction of the Signal Corps "Reduced Inspection Quality Assurance Plan." The completeness of your manufacturing process and quality controls, the supporting inspection records, and the quality of your end product have enabled us to adopt a reduced inspection plan on AN/TCC-4, Telegraph Terminal Equipment.

It is with great pleasure that I express our appreciation for your interest and performance which permitted introduction of RIQAP at your plant. The operation of this plan will work to our mutual benefit in reducing costs and improving our relationships, at the same time insuring the delivery of high quality equipment to the Army.

Sincerely yours,

Wm. L. Bayer

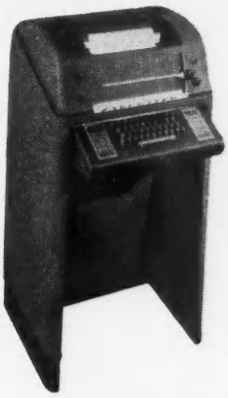
WM. L. BAYER
Brigadier General, USA
Commanding

R.I.Q.A.P.

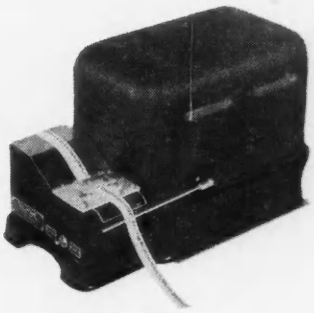
We are proud of this unusual recognition by the Signal Corps

BUILDING THINGS RIGHT IS A HABIT AT

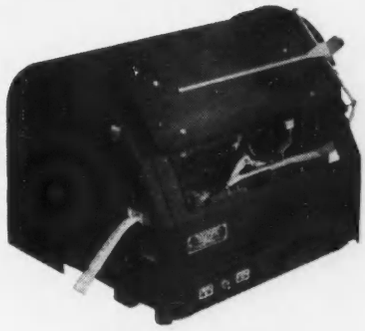
KELLOGG
A DIVISION OF I T & T



PAGE PRINTER



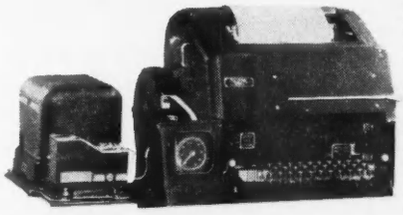
TAPE TRANSMITTER DISTRIBUTOR



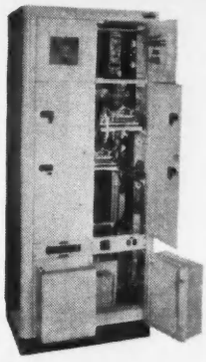
TYPING REPERFORATOR

TELETYPE EQUIPMENT MEETS THE GROWING DEMAND FOR PRINTED COMMUNICATIONS

Send-Receive Printer, Tape Transmitter Distributor, Keyboard Tape Perforator

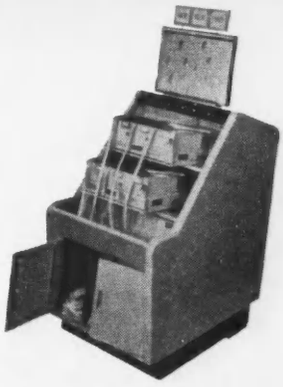


COMPOSITE SET



Receiver Cabinet

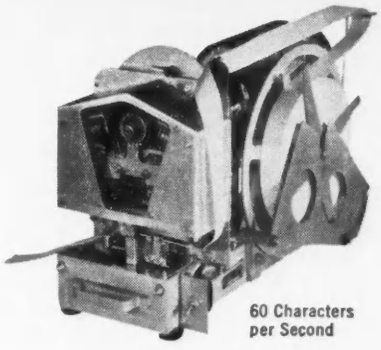
"TORN-TAPE" RELAY EQUIPMENT



Transmitter Cabinet

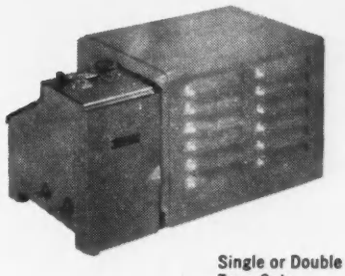
"TORN-TAPE" RELAY EQUIPMENT

TELETYPE EQUIPMENT MEETS THE GROWING DEMAND FOR PRINTED COMMUNICATIONS



60 Characters per Second

HIGH SPEED TAPE PUNCH



Single or Double Tape Gate

HIGH SPEED TAPE READER

A new issue of the booklet "The ABC's of TELETYPE Equipment" is available upon request. Write to:
Teletype Corporation, Dept. TEM1
Sales and Merchandising
4100 Fullerton Avenue, Chicago 39, Illinois

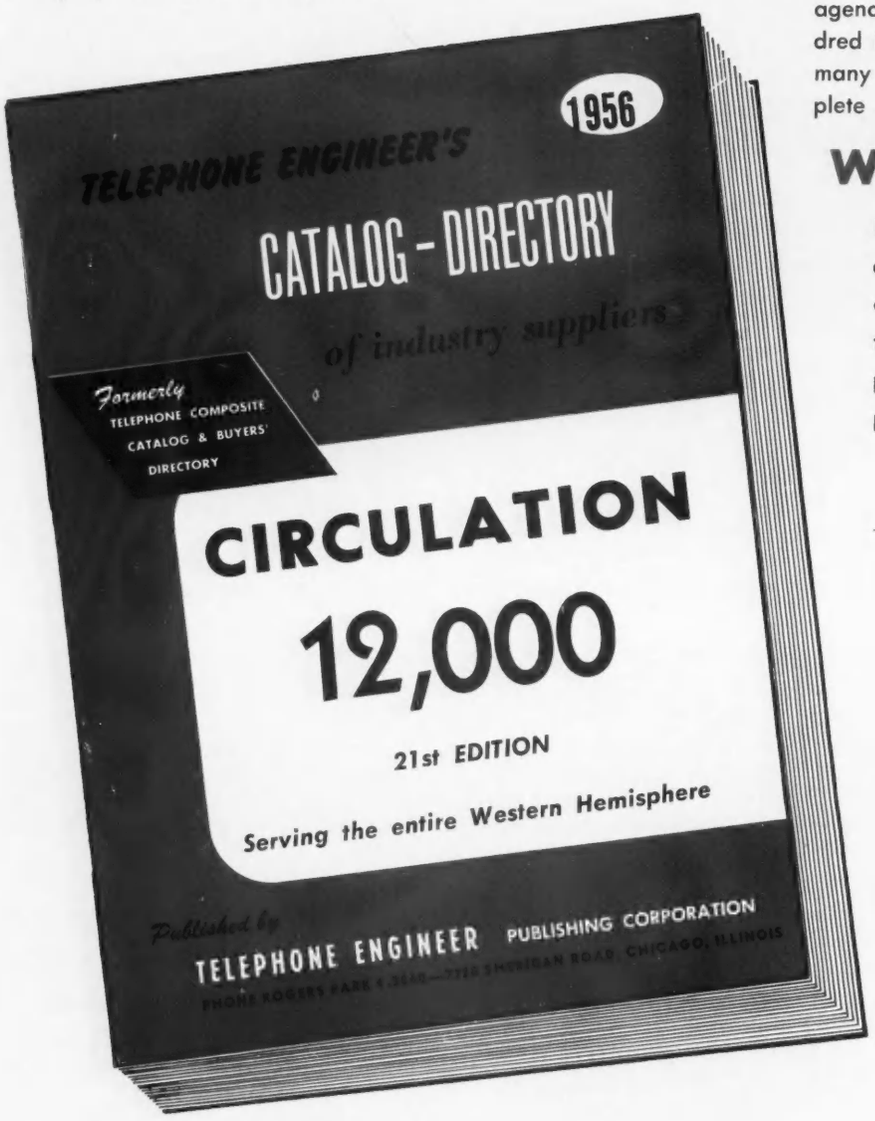
TELETYPE®

TELETYPE CORPORATION
SUBSIDIARY OF
Western Electric Company
INCORPORATED

If You Are Marketing To The $17 Billion Telephone Industry

Keep your sales story at the finger tips of all key men throughout every day in the year!

It is an easy and economical thing to do. Merely display your products and/or services in the coming 1956 Telephone Engineer's CATALOG-DIRECTORY of industry suppliers. From May 1, 1956 through May 1, 1957 such advertising will serve as your "on the spot" representative when specifications are being drawn and buying decisions are being made.



Circulation

CIRCULATION 12,000 (More than double the circulation of any other telephone buyers' directory). Encompasses every telephone company in the Western Hemisphere including the communication departments of all railroads; most oil, refinery and pipe line companies operating telephone systems, governmental agencies — army and navy plus several hundred industrials. A multiple circulation among many companies assures advertisers of complete coverage of buying personnel.

Why Buyers Prefer It

BECAUSE — A — It is designed solely as a Buyers' Guide. Its pages are devoted exclusively to furnishing aid and information of value to managers, specifiers and purchasers of telephone equipment, supplies and/or services.

— **B** — Telephone Engineers' CATALOG-DIRECTORY has many more manufacturers and suppliers and has a greater number of product listings than can be found elsewhere . . . thus giving buyers a greater and larger source of supply.

and quite important

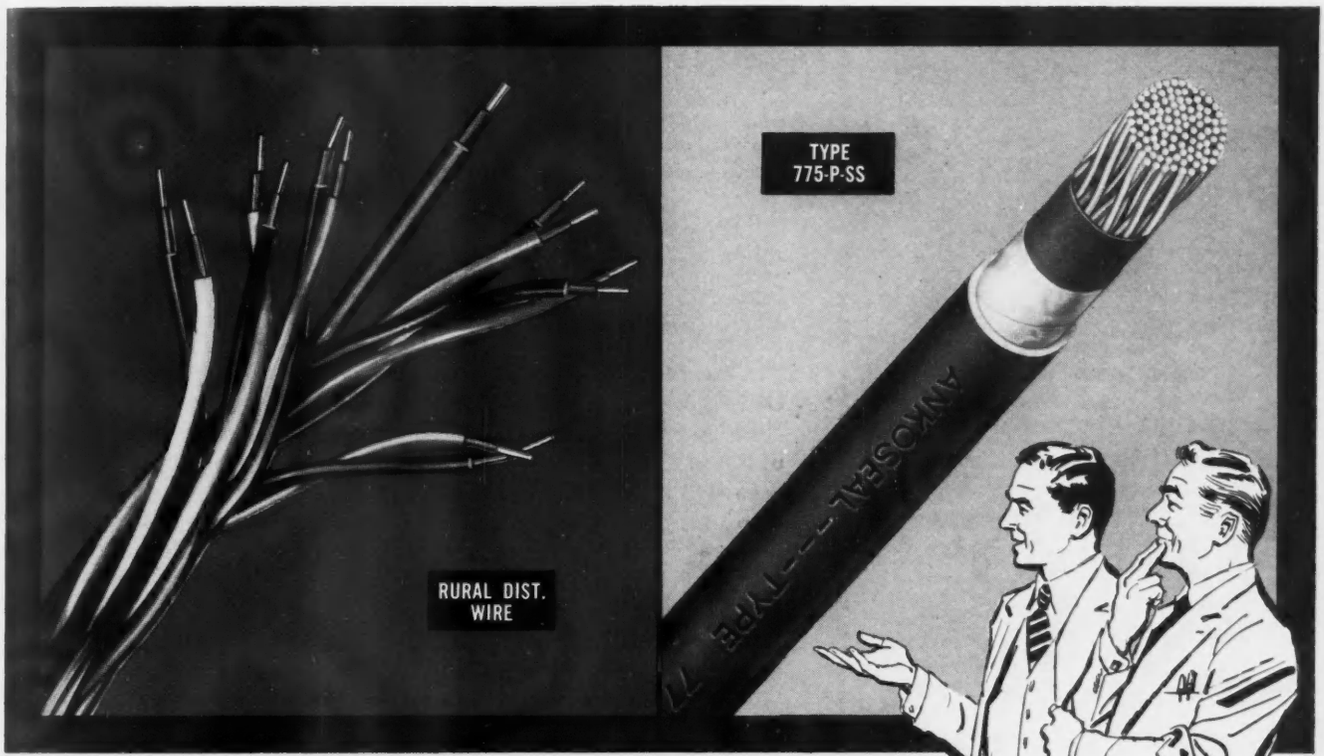
Advertising rates are approximately **40%** less per copy than in any other telephone buying directory.

Write for complimentary copy — rate card, etc.

TELEPHONE ENGINEER Publishing Corporation

Phone ROgers Park 4-3040 • **7720 Sheridan Road, Chicago 26, Illinois**

How do you choose self-supporting cable?



THERE ARE TWO TYPES OF 19 GAUGE SELF-SUPPORTING **Ankoseal** . . . EACH BEST FOR A SPECIFIC NEED

RURAL DISTRIBUTION WIRE

Without shield or jacket, the individual conductors are insulated with polyethylene plus a PVC outer covering made in three, six, eleven and sixteen pairs. The fully color coded pairs are cabled around a polyethylene insulated, high strength, 109 galvanized steel support wire. Suitable for fast, low cost construction to provide temporary service or cable relief.

TYPE 775-P-SS

This is the standard Ankoseal self-supporting cable, fully shielded and PVC jacketed for permanent installation. Made in six, eleven, sixteen and twenty-six pairs. Shielding protects against induced noise. The PVC jacket provides uniform transmission characteristics under all weather conditions. Elimination of the messenger speeds installation and reduces cost.

Technical service on specific installation requirements is available upon request from Ansonia.

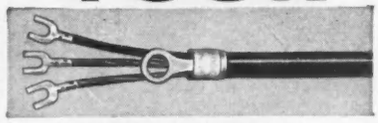
ANSONIA
Ankoseal®
'The first all-plastic cable'

ANSONIA WIRE & CABLE COMPANY • ANSONIA, CONNECTICUT

CORDS BY *Runzel*

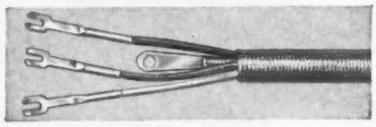
YOUR

NEOPRENE



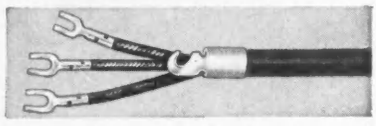
BEST

NYLON



BUY!

COTTON



Are you familiar with the features of these fine cords?

NEOPRENE covered cords are a highly serviceable cord, extensively used in a wide variety of services. They are moisture and grease proof . . . easy to keep clean.

NYLON covered cords are a relatively new development in telephone cords. Their fine smooth texture makes them the preferred cords for switchboard use. They give long service. Preferred by operators because of their fast, easy handling.

COTTON cords are in standard use everywhere. Their fine woven wrap makes them very serviceable for all around purposes.

Take your choice—Neoprene, Nylon or Cotton. They're all high quality cords made in accordance with Runzel high standard of quality. We carry a large stock of cords for every purpose.

Our geographical location means QUICK SERVICE.

RUNZEL
Cord and Wire Co.
4723 W. MONTROSE AVE.
CHICAGO 41, ILL.

Thoughts for Today

Collected by DICK ALLEN

Old Age

Old age is not so much a time of life as a state of mind. Some are old in mind and spirit when they are still relatively young in years. These are the people who have lost interest in work and play, whose sense of humor has vanished, who isolate themselves from the world about them and resign prematurely to the rocking chair.

Others seem never to lose their mental vigor and their zest for the adventures of life. These are the men and women who, while yielding gracefully and sensibly to the limitations which the years impose, continue to learn, to work, to participate as fully as possible in life and to enjoy it. That I think is the key to the question. To keep our minds and spirits young we must keep them active, otherwise they grow moribund. — BERNARD BARUCH.

* * *

The Top

If an executive is to reach top management levels, he must have a broad view — a width of scope, vision and perspective. In meeting whatever problem he is called on to solve, he must be able to analyze and comprehend its relation to all other aspects. — THE AMERICAN APPRAISAL COMPANY BULLETIN.

* * *

Stock Ownership

We are privileged to live in a country where any man or woman is free to purchase an ownership interest in a great American business. This opportunity, this privilege, is one of the strongest elements in America's free enterprise system. It is part of our priceless heritage of equality and freedom . . . There is no Stock Exchange in Moscow.—G. KEITH FUNSTON.

* * *

Financing Old Age

The essence of any plan for financing old age is saving — to put aside some part of today's earnings for the future. Anything that saps the value of savings — and inflation is the worst single threat — is the enemy of the aged and of those who expect to grow old.—BERNARD BARUCH.

* * *

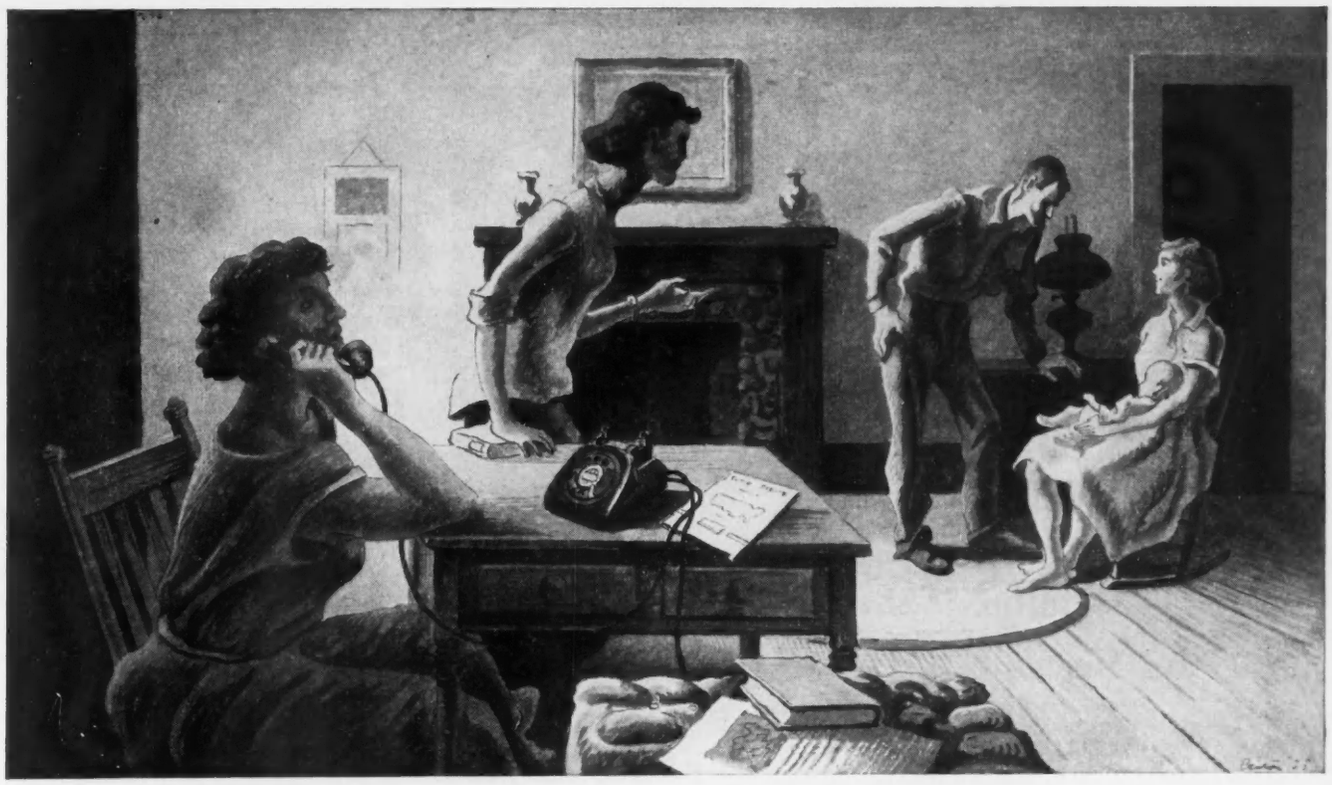
Progress

The prudent, penniless beginner in the world labors for wages for a while, saves a surplus with which to buy tools or land for himself another while, and at length hires another new beginner to help him. This is the just, and generous and prosperous system which opens the way to all, gives hope to all, and consequently energy, and progress, and improvement of conditions to all.—ABRAHAM LINCOLN.

* * *

Understanding

The great scientific discoveries of the past hundred years have been as child's play compared with the titanic forces that will be released when man applies himself to the understanding and mastery of his own nature.—MELVIN J. EVANS.



FAMILY COUNCIL

BY Thomas Hart Benton

The telephone brings even far-off members of the family to the council table in voice at least.

Toll calls are an increasingly important source of revenue to telephone companies. Does your directory contain adequate instructions for placing of long-distance calls? Or do your operators spend too much time explaining the procedure to subscribers who use the long lines?

Tried-and-proved long distance information is only one of the many advantages of retaining Loomis' complete telephone directory service.

There are many other ways to build an accurate directory—more useful for your subscribers . . . a more powerful medium for your Yellow Page advertisers . . . and more productive in net revenue for your stockholders, your employees and yourself.

You owe it to yourself to find out the full details of Loomis' complete directory service for increasing advertising revenue and building public relations. There's no obligation on your part when you write or call the Loomis office nearest you.

LOOMIS

ADVERTISING COMPANY

Over 785 cities and towns in 20 States are served by 257 Loomis-built directories.

We have commissioned Mr. Benton to draw four scenes of American Life. A limited edition of 9 x 15-inch prints suitable for framing has been ordered. We think they offer a nice public relations touch to your telephone office decoration. To get your Benton print FREE, write Wesley H. Loomis III, 810 Baltimore, Kansas City, Mo.

LIFTS YELLOW PAGE REVENUE . . . BUILDS PUBLIC RELATIONS

"Where to Call"

KANSAS CITY
810 Baltimore
HArrison 1-1270

FORT WAYNE
229 E. Berry St.
EAstbrook 3477

Canada Retains "Talkingest Nation" Title; Iceland Moves U.S. Out of Second Place

WITH ONE TELEPHONE, on the average, for every three persons, the U.S. had more than half of the world's 94.5 million telephones on January 1, 1955. About 5.3 million telephones were added throughout the world in 1954.

According to the American Telephone & Telegraph Company's annual survey, "Telephone Statistics of the World," Iceland has replaced the United States as the second talkingest nation in the world.

Canada, with 417 conversations per capita, is in first place for the third consecutive year. Iceland with 394 conversations per capita, nosed out the U.S., which had 393. More than half of Iceland's telephones are in its capital city, Reykjavik, as is 40 per cent of its population.

These figures are for the year 1954, since it takes almost a year to collect information from more than 250 governments and companies in other parts of the world. Telephone service in the U.S. is supplied by some 4,800 private companies, together with thousands of connecting rural or farmer lines and systems.

The Netherlands installed its one millionth telephone in 1954, bringing the total number of countries on the "more than a million list" to 12: The U.S., the United Kingdom, Canada, German Federal Republic, France, Japan, Sweden, Italy, Australia, Switzerland, Argentina and the Netherlands, in that order.

Prior to 1927, the telephones of only three other countries could be connected with Bell System telephones. Those countries were Canada, Mexico and Cuba. Canada and Mexico were connected by land-line, Cuba by cable. Then, in January 1927, the first overseas radiotelephone circuit was established — between New York and London.

At the beginning of 1955 a customer in the United States could call any one of 91 million telephones in more than 110 countries or areas, including the U.S. Overseas service was extended to three new points during 1954; Goa, in Portuguese India; British Malaya (including Singapore); and Thailand. In 1955, Ascension Island, in the South Atlantic, and French Equatorial Africa were added.

Circuit Judge Ends Injunction on Plastic Covers

AN INJUNCTION ordering a Woodstock, Ill. plastics firm to halt manufacture and distribution of plastic telephone book covers was ordered dissolved last month by Circuit Judge Bernard M. Decker, Waukegan, Ill.

Attorney Max Lidschin, who represents Tower Lake advertising man Willard F. Miner, defendant in an action filed last October by the Illinois Bell Telephone Co., said the court order means that manufacture and distribution of the plastic covers may be resumed.

Illinois Bell and the Nazareth Rug Cleaners of Chicago filed suit October 6 against Miner and Leslie C. Heyden of Woodstock, operator of the Woodstock Plastics Co., asking a court order halting production of plastic phone book covers. Miner operates an advertising firm which sold space on the covers.

The suit alleged that the covers were being affixed to telephone books without permission, constituting an unlawful trespass. The suit also charged that the wrong number was listed on the covers for the Northbrook (Ill.) Police Department, and persons calling the number listed got the Chicago rug firm instead.

The injunction ordering that production and distribution of the covers be halted was signed October 7 by Circuit Judge William R. Dusher of Rockford, Ill.

According to Illinois Bell, manufacture or distribution of plastic covers will not be permitted, however, pending decision of the Illinois Bell appeal. This is the effect of a supersedeas order entered by Judge Decker immediately afterwards. That order has the effect of continuing the injunction in force until the appeal is finally decided.

Big Year Expected By Citizens Utilities

CITIZENS UTILITIES Co., Stamford, Conn., expects earnings for 1955 to follow the higher trend set in the first nine months, according to Richard Rosenthal, president. This would mean an increase to roughly $1.12 a share from $1.06 in 1954. Next year, Citizens plans to spend $2,500,000 on new construction, of which about $1 million will come from bank loans and the remainder from depreciation allowances and retained earnings.

Supplying telephone, gas, water and ice services to customers in seven

states from Maine to Arizona and the territory of Alaska, the company will use the new funds for several dozen projects including, raising the number of dial telephones in its California system above the present 70 per cent.

According to Mr. Rosenthal, Citizens Utilities is investigating the possibility of buying ten gas, electric, telephone and water properties valued at between $15 million and $20 million. The company is also working on a plan that will generate extra cash for buying such additional properties and paying for new construction through the retention of a larger share of earnings.

For the past nine years Citizens has held onto a part of its earnings by paying dividends partly in stock. But earlier this year a company survey showed that owners of 55 per cent of its outstanding shares favored getting their dividends in stock alone, while another 38 per cent preferred stock and some cash. A new dividend scheme involving a voluntary reclassification of the company's common shares to make it possible for each shareholder to take all his dividends in stock, cash or some of each has been worked out and is now awaiting Government approval.

Calif.-Interstate Names Barrows To New Post

THE APPOINTMENT of John H. Barrows to the office of secretary and assistant treasurer of California Interstate Telephone Co., San Bernardino, Calif., effective December 1, 1955, has been announced by Willard Wade, president. Mr. Barrows succeeds the late Philip W. Thompson.

Mr. Barrows has 20 years' service with Interstate, having started as a chainman in July, 1935. In 1939 he was appointed clerk, and in July, 1941, a junior engineer. In December, 1941 Mr. Barrows entered military service and served as Captain in the 101st Airborne Division. Upon his return he was appointed an engineer, and progressed to toll engineer, assistant outside plant engineer, and in 1954 became staff engineer reporting to the company president.

New Rates OK'd For Trumansburg Telephone Co.

THE NEW YORK Public Service Commission has accepted a tariff amendment filed by Trumansburg Home Telephone Co. designed to increase rates by an estimated $27,200 annually. The company serves about 3,400 telephone stations in Trumansburg, Ovid, Interlaken and surrounding rural areas in Seneca, Schuyler and Tompkins counties. It has dial offices in Trumansburg and Ovid and a manual office in Interlaken. This is the company's first rate increase since 1949.

In filing its new tariff, the company said its plant investment has increased from about $315,000 in the beginning of 1953 to $683,000 at the present time as the result of its conversion of two offices to dial operation and that it expects to expend another $55,000 during the first nine months of 1956. Additional revenues are needed to enable it to continue adequate service.

A comparison of present and new

Busy Manager

Mrs. Bert Bradley, 64, owner of the *Brookville (Kans.) Telephone Exchange,* recently marked her 25th year in the business. She is probably the only woman in Kansas to climb a pole and repair lines when telephones are out of order. Since her husband's death eight years ago, Mrs. Bradley has been lineman, repairman, chief operator, and bookkeeper.

Until she underwent an operation a year ago, Mrs. Bradley carried line wire, scaled poles with a ladder, and tracked down poor wire connections.

The Bradleys drove to Kansas from Colorado in a covered wagon in 1913. Mr. Bradley got a job with a Plainville (Kans.) Telephone Co. and then purchased two telephones and taught his wife how they operated. The couple moved from Plainsville to Gypsum, Kans., where Mrs. Bradley started work as a telephone operator and assistant. Remaining there two years, they moved to Belleville, Kans., to operate the exchange. From there they moved to La-Cross, Kans., then to Chase, Kans., where they bought the telephone firm.

They sold that later and bought the exchange at Benedict, Kans. They then moved to Brookville.

Today, the Brookville Telephone Exchange has 140 subscribers and approximately 119 miles of line.

in any emergency!

LOWELL WIRES GET THE CALL THROUGH

The technical staff at Lowell Insulated Wire Company uses many physical tests to determine the effect of heat, aging, tensile strength, compression, cold, acids, oils, moisture and abrasion. They also employ extensive electrical tests. To create the maximum performance and dependability which is characteristic of Lowell Insulated Wire, many factors have been combined in a well balanced and efficient manufacturing process. That is why through long years in actual service Lowell Wires maintain a record for reliability and low maintenance or replacement costs. Write today for details.

"FINE WIRES ONLY"

DROP WIRE — neoprene jacketed, rubber insulated — between buildings and open wire telephone line.
BRIDLE WIRE — neoprene jacketed —link between drop and inside wires.
DUCT WIRE — plastic insulated — used inside buildings for connecting outside circuits to station sets.

LOWELL INSULATED WIRE DIVISION
OF The Overlakes Corporation
171 LINCOLN STREET ··· LOWELL, MASSACHUSETTS

Neoprene Jacketed, Rubber Insulated Drop Wire, with Bronze, Copperweld or Copper conductors, Brass flashed or tinned — Neoprene Jacketed Outside Distributing Wire — Tree Wire — Plastic Insulated Inside and Duct Wire — Jumper and Distributing Frame Wire — Glazed Braided Inside Wire.

rates is as follows: Residential service, individual line, increased from $3.25 to $4.50; four-party and ten-party rural, from $2.50 to $3.25. In addition, a new two-party residential service is offered at $3.75 monthly. Business service, individual line, increased from $4.50 to $6.00; two-party, from $4.00 to $5.25; four-party, from $3.50 to $4.75; ten-party rural, from $3.00 to 4.00.

Samp Elected Director, La Crosse Tel. Corp.

JUDSON LARGE, president of the La Crosse (Wis.) Telephone Corp. has announced the election of E. B. Samp to the board of directors. Mr. Samp will continue as vice-president and division manager of the company with headquarters at La Crosse.

Mr. Samp is also vice-president and division manager of Middle States Telephone Co. of Ill. and division manager of Central Telephone Company's properties in Iowa, Minnesota and North Dakota.

Arkansas Tel. Co. Plans $109,600 Dial Project

THE ARKANSAS Telephone Co., Inc., has announced plans to convert its exchanges at Clinton and Shirley, Ark., to dial. The plans were outlined in an application to the Arkansas Public Service Commission for authority to borrow $105,000 from a St. Louis bank to finance the construction.

The application said that in addition to the new equipment and the general improvement of facilities to serve customers in adjacent areas, the company plans to buy property in Clinton and Shirley to house the central dial equipment and for offices. The aplication said the total construction cost would be $109,600.

So. New England Tel. Plans $46,000,000 Construction

PLANS FOR A 1956 construction program totaling $46-million were reviewed by directors of The Southern New England Telephone Co. at a meeting last month.

At this session, they elected John Lashnits of New Haven a vice president of the company, in addition to his previous position as general counsel, and declared a regular quarterly dividend of 50 cents per share. This will be payable January 16 to stockholders of record on December 20.

The 1956 construction budget, larg-

est in the company's history compares with $40.5 million spent this year. Reviewing the program, Vice President Ernest A. Johnson said this year's figure was increased above the original estimate by a larger telephone gain than had been anticipated, and construction work made necessary by floods.

Mr. Johnson said the 1956 budget was allocated as follows: Land and buildings, $5.8 million; central office equipment, $11.8 million; telephone equipment on customers' premises, $13.6 million; outside plant, $13.5 million, and general equipment, $1.6 million. The increase in the budget is largely accounted for by a $5 million increase in central office equipment, for both local and toll calling.

Increased needs for central office equipment next year, Mr. Johnson said, will arise not only from growth in the number of telephones, but also an increasing trend to individual lines instead of party line telephones. Individual lines in Connecticut residences are expected to increase from 55 per cent of the total now to 61 per cent by the end of next year, with a corresponding reduction in the proportion of party lines.

Increasing use of colored telephones was also reported. The company installed 25,000 in 1955, and expects to install 35,000 in 1956. Automatic answering devices are another new development meeting favor, with 550 installed this year and 870 estimated for next year.

3-D Dialing Cutover Completed at Pekin, Ill.

AT 12:01 A. M., SUNDAY, December 4, 1955, the Pekin, South Pekin and North Pekin, Ill. exchanges of the Middle States Telephone Co. became the first Independent exchanges to provide its customers with direct (nationwide) distance dialing.

In describing the new milestone in Independent telephone progress, telephone officials pointed out that other Independent companies already provide limited area customer toll dialing, and others have installed equipment to enable their toll *operators* to dial direct to distant points. But, the Pekin exchanges are the first of the some 5,000 Independent companies to offer *subscribers* facilities for direct distance dialing, (that is, nationwide long distance dialing which they can do themselves with-

A Historical Call

Telephone history is made in Pekin, Ill. as state Senator **E. B. Groen** completes a directly-dialed call to Senator **Everett Dirksen** at Washington, D.C., the first such call to be made from an Independent telephone company exchange.

Witnessing the "first" are, left to right: **Carl Prellwitz,** district commercial manager; **E. B. Samp,** Middle States vice president and district manager; Mayor **Norman Wolfer; John Alder,** district plant superintendent who also serves as conversion director; and **Robert Long,** district manager.
— *Pekin Times* photo

Toll Ticketing Explained

Mysteries of automatic toll ticketing are explained to Pekin, Ill. officials just prior to cutover of first subscriber direct distance dialing for an Independent telephone company.

Left to right: City Attorney **Dick Milford;** Commissioner **George Bush;** Mayor **Norman Wolfer; Lloyd Godfriaux** of Middle States Telephone Co.; **P. F. Smith** of Automatic Electric Sales Corp., and Commissioner **A. B. Foster**

out the aid of an operator) to all points now linked with the coast to coast direct distance dialing network of the Bell System. This means that Pekin subscribers may now dial direct to some 18,000 telephones in 14 states and the District of Columbia on a station-to-station basis.

The new service was inaugurated when Illinois State Senator E. B. Groen picked up a telephone handset and proceeded to dial "90," the access code; then 202, the area code for the District of Columbia; then the local telephone number for United States Senator Everett Dirksen in Washington, D.C.

Distinguished guests present then took turns speaking with the Senator and acquainting him first hand with events taking place in Pekin.

Among those present from the Middle States Co., were: Colonel Leonard D. Densmore, vice president and general manager; E. B. Samp, vice president and division manager; Toral Duckett, assistant general manager; A. E. Lindekugel, division commercial manager; William McGrew, state commercial manager; R. R. Long, Pekin district manager; and Robert Schumm, D. H. Hansen, Charles Eskrich and Vern Clark.

From the Illinois Commerce Commission, William Vicars, Edward Milcher and Francis Cody. From Illinois Bell Telephone Co., A. T. Renn, general commercial agent; H. A. Douglas, agent for connecting companies; and C. H. Tibble, connecting companies representative. From the Illinois Telephone Association, Morris Kugler, president and J. Hardy. From Automatic Electric Co., H. F. Lello, executive vice president. From Automatic Electric Sales Corp., D. H. Deaver, president; L. E. Savage, district manager; L. J. Gaddis, staff engineer; and P. F. Smith, Illinois representative.

Receives Ad Award

J. N. Burnett, Jr., (left) advertising production manager of Southern Bell Telephone & Telegraph Co., and **C. L. Buckingham,** advertising manager, receive the "Joshua" plaque from **M. S. Wylie** of Atlanta, Ga., match industry representative (right) in recognition of the company's selection for "the most distinguished use of match book advertising" by a utility during the past year. The award was made for the company's use of specially-shaped match books in eight different colors promoting the eight colors of telephone receivers available to the public. The match books show the receiver in color, and the ends of the receiver protrude from the sides of the match book, an additional attention-getting factor for the 5,000,000 match books distributed during the past year. A panel of 15 outstanding advertising and marketing experts judged the best entries in each of 46 industries, among the 300,000 match book designs used by advertisers during the year.

Virginia Co-op Plans Dial Cutover at Floyd

THE CITIZENS Telephone Cooperative of Floyd County, Va., converted to dial operation January 8. The change over affected 630 subscribers.

As part of an improvement and expansion program the co-op also will move into a new one-floor and basement exchange building at Floyd, Va.

W. R. Dunn, manager of the co-op, said he is "agreeably surprised" at the response for dial service. He said the firm has a waiting list of people who want to become dial customers.

The new headquarters building and dial equipment are being financed through a $460,000 loan through the Rural Electrification Administration. But Mr. Dunn said only $365,000 was used for the conversion.

The exchange building has offices and rooms for the telephone equipment on the main floor. In the basement are a garage, boiler room and storage space.

Citizens Telephone Cooperative, formed just a few months ago, succeeded the Floyd Mutual Telephone Co.

Dial System Planned For Hollis, Okla.

WORK HAS started on an addition to the Southwestern States Telephone Co., building at Hollis, Okla. The new section will house a dial system for Hollis, Gould and surrounding areas. March 1 has been set for the completion of the new annex. The dial system will have a toll hook-up with Altus thus becoming a part of the nation-wide toll-dial network.

Rate Boost Approved for Summit Tel. Co.

THE NEW YORK Public Service Commission has accepted a tariff amendment filed by Summit Telephone Co. designed to increase rates by an estimated $1,500 annually. The company serves about 168 telephone stations in and near Summit, Schoharie County.

In filing its new rates, the company reported an operating loss for 1954 and said the additional revenues were needed to enable it to at least break even. Under its new tariff, residential service bills will be increased by 75 cents monthly and business rates by $1.50 monthly for individual lines and by $1.00 monthly for party-line service. The company has only one customer which it serves under the business rate.

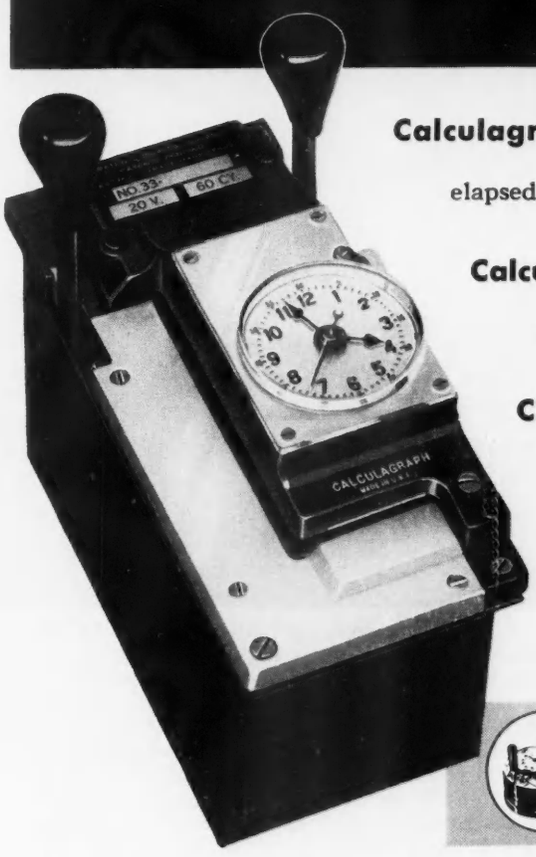
Spotlighting toll service—

CALCULAGRAPH

...speeds toll service

...protects toll revenues

Photo courtesy of
Kellogg Switchboard and Supply Company



Calculagraph automatically figures toll time – Eliminate time-consuming, service-slowing manual figuring of elapsed time on toll calls. Calculagraph is quicker, easier, completely accurate. There is no possibility of clerical errors.

Calculagraph is accurate to the second – Precision calculations by Calculagraph are accurate down to the last second... make it possible to collect all the revenue due on every toll call. Calculagraph records are indisputable.

Calculagraph prints permanent toll records – Elapsed time records printed on permanent toll tickets make accounting methods simpler, more efficient. Tickets are easier to read, permanently legible, available for reference at any time.

AUTOMATIC TOLL TIME CALCULATING AND RECORDING *PAYS!* Complete information is contained in the Calculagraph Bulletins available in a handy file folder. Write for your copy to **Dept. TE.**

CALCULAGRAPH COMPANY
HARRISON • NEW JERSEY

THE STANDARD OF ACCURACY . . . SINCE 1892

We doubled the load on two old iron wires with LYNCH CARRIER EQUIPMENT ...recommended by Graybar

SAYS:
FRANCIS N. WILLKOM,
GENERAL MANAGER
FARMERS TELEPHONE COMPANY
LANCASTER, WISCONSIN

"We've come a long way since the 1890's when, to become a subscriber, a person had to pay ten dollars or build a mile of line . . . and switching dues were only a penny.

"Today, though we provide modern telephone facilities for more than 2600 subscribers, we're still a small company and have to rely on our suppliers for help and information.

"This is one of the many reasons why we've been doing business with Graybar for over forty years. Not being able to tie up a lot of capital in supplies and inventory, we necessarily depend on the Graybar warehouse system. Graybar always provides exactly *what* we need — *when* we need it.

"Then again, I can't say too much about Graybar personnel. Graybar Telephone Specialists know their business and are wonderful to do business with. They keep us up-to-date on new equipment and techniques and their suggestions are often invaluable. The Lynch carrier unit we installed in February is a sample of a Graybar suggestion that really paid off. Better yet — Graybar assistance in these out-of-the-ordinary problems is freely given, there's never any feeling of obligation on our part.

"This kind of service and cooperation really mean a lot to a small independent like the Farmers Telephone Company."

You too can benefit from Graybar's services! Pole line supplies for maintenance and new construction . . . exchange and office equipment . . . linemen's tools and safety equipment — all are conveniently available from Graybar warehouses located near you. Call us for any telephone need. Like you, Graybar is proud of its independent status and the fact that it is owned and operated solely by its operating and retired employees. 501-221

Wire Chief Lawrence Esser personally installed this Lynch B-28 carrier system on an 11-mile iron wire circuit between Cassville (dial) exchange and the Glen Haven (magneto) exchange. There were no difficulties experienced in terminating units and, to date, maintenance problems have been nil. In spite of the iron wires, the system has operated so well that before the two circuits were balanced, subscribers were asking to have their calls placed on the superior carrier circuit. Present plans are to install an additional Lynch carrier on an equally overloaded 18-mile circuit between Potosi and Cassville.

Out in the field, Manager Willkom and Wire Chief Esser check progress on the installation of a new circuit. For new work like this or everyday maintenance, both Willkom and Esser recognize the importance of quality tools and supplies . . . and the respect line crews have for the well-known products distributed nationally by Graybar.

This reproduction of an old photograph taken in the 1890's shows the wife of the founder of Farmers Telephone at the original handmade switchboard. The company, today, employs 24 persons and efficiently serves the southwest portion of Grant County.

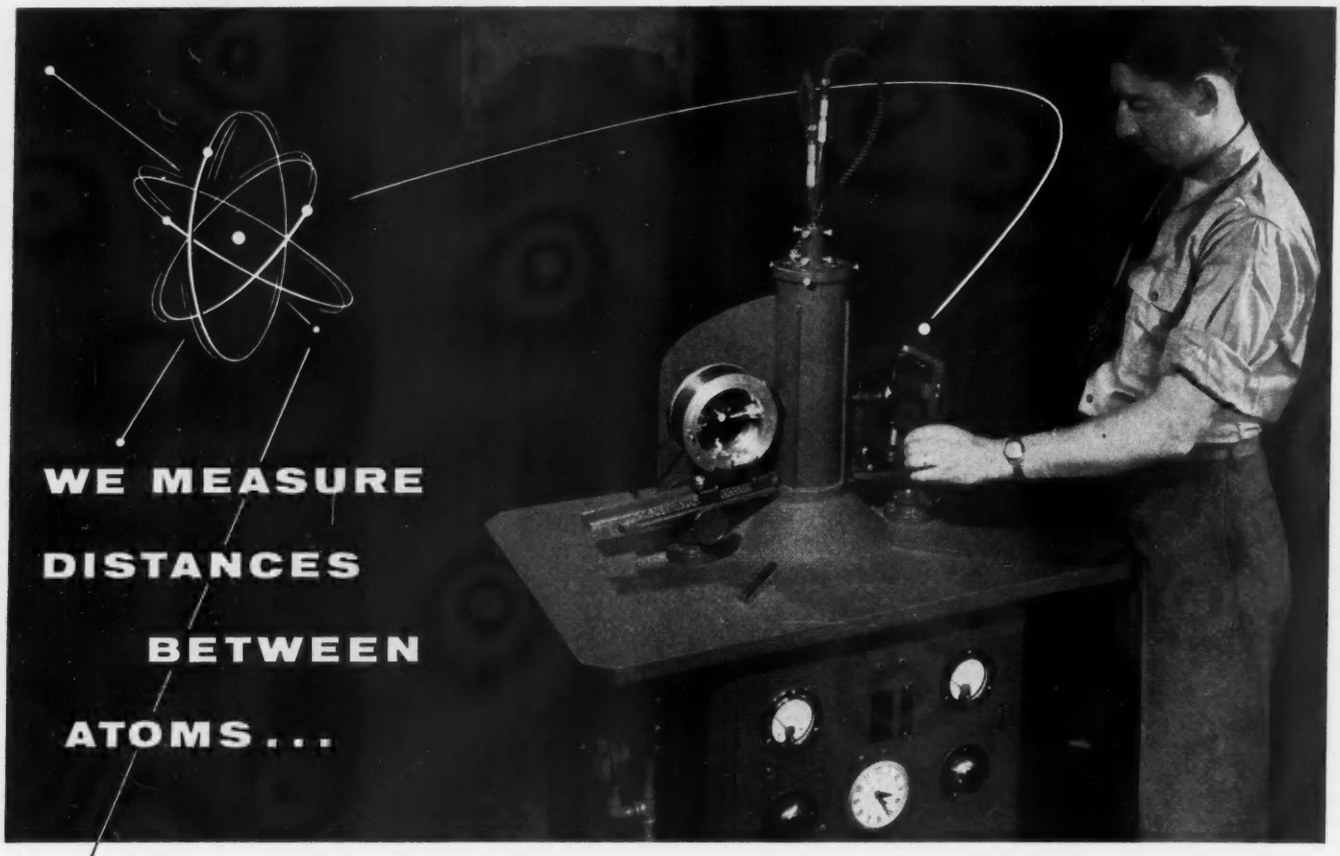
Here Graybar Telephone Specialty Salesman Sabo and Manager Willkom discuss a list of telephone supplies — ordered from Graybar. Like many independents, Farmers Telephone looks to its suppliers for technical help and information. In fact, it was during a similar conversation over a cup of coffee that disclosed the problem of an overloaded circuit and led to Sabo's suggestion of a trial of the Lynch equipment.

Call Graybar first for...

GRAYBAR ELECTRIC CO., INC.
Executive Offices:
Graybar Building, New York 17, N.Y.

GraybaR QUALITY *Everything Electrical*

IN OVER 110 PRINCIPAL CITIES



TO GIVE YOU *Advance Design* BATTERIES!

The X-Ray Diffraction Unit shown above is one of the few instruments of its kind being used in basic battery research. It identifies complex metallic compounds which cannot be identified practically by chemical means. It does this by actually indicating on film the distances between atoms, enabling Gould engineers to study atomic structure.

This instrument . . . this research . . . is revealing hitherto unknown facts about the relationship between molecular activity and battery performance . . . pointing the way toward more powerful, longer lasting active materials. That's why you get *better* batteries when you buy Gould!

For the full story on Gould Research, send for Booklet 749.

America's Finest!
GOULD PLANTÉ
The Aristocrat of
Stationary Batteries

©1955 Gould-National Batteries, Inc.

GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

Telephone Engineer

EDITORIAL

Telephone Engineer

"For The Community's Good"

A FEW WEEKS back Cleo F. Craig, president of the American Telephone & Telegraph Co., journeyed down to Philadelphia and accepted the Gold Medal of Merit awarded by the University of Pennsylvania's Wharton School Alumni Society.

In accepting the award Mr. Craig made a few remarks that we feel deserve close reading by all telephone people whether they serve the public in a large exchange or a small exchange.

The real meat of his remarks came, to us at least, when Mr. Craig said: —

"*No one can accept responsibility in the world unless he takes it first on his own doorstep. So for us in industry, I can see only one course to follow. Call it common sense, call it policy, call it anything you like. To my mind industry must aim for, exist for, and everlastingly operate for the good of the community. The community can't ride one track and business another. The two are inseparable, interactive and interdependent . . .*"

We're glad a telephone man spoke those words. They are words that needed saying and bear repeating. In a sense they describe an age-old telephone industry policy which has as its base the sincere aim to "*everlastingly operate for the good of the community.*"

We will grant, as President Craig does, that business is also a way of making a living. *No business can succeed in serving the public well unless it succeeds financially and the people in it obtain reasonable awards.*

"I realize," Mr. Craig said, "that the pulls of self interest are very strong and furnish valuable incentives of their own. But let me ask you this question: Ought not a sincere concern for the common welfare—the desire to build the best possible community — shouldn't that be as much the goal of a business as it is of this Wharton School —? . . . Or I'll put it another way: Should we divide our population up in some manner between those who pursue the aims of business and those who want to work for the good of society? Who would say yes to that?"

Certainly no telephone man or woman would answer "yes" to that question. Of that we feel sure. We say this because we know telephone management people long ago realized it is impossible to be good trustees for the share owners and not fulfill their trusteeship of service to the public.

Attention to that "trusteeship of service to the public" is part and parcel of the telephone industry's main objective.

Mr. Craig described this as — ". . . the broad mark of sharing in a joint endeavor, a common effort to really serve the community with the best one has to give . . ."

"Our problem," he said, "is—as working men and women always busy with the day-to-day job—how can we do the most, and what activities will most reasonably help us, to become bigger people, with better understanding of social and public affairs—men and women broader in outlook, and thereby better able to see the ultimate as well as the more immediate effects of the decisions we are called on to make?

"As one answer to this, it seems to me that everyone who shares the responsibilities of industry will gain at least something worth while from the deliberate effort to study the relation between his own work, the work of others, the activities of government and the well-being of the community; to do this objectively and in so far as possible through participation in a group."

These are good thoughts expressed by an industry leader, and, as we said a few paragraphs back, we're glad a telephone man spoke them.

(The foregoing editorial, although copyrighted, may be reproduced in whole or in part without charge, provided credit is given this publication and a copy of such reproduction is filed with this publication. This legend need not appear on the publcation.)

Here's 1 reason why XY® Toll Ticketing can help you make more money...

Call No. 1 is completed, and in a split second . . .

the same toll trunk is ready for the next call!

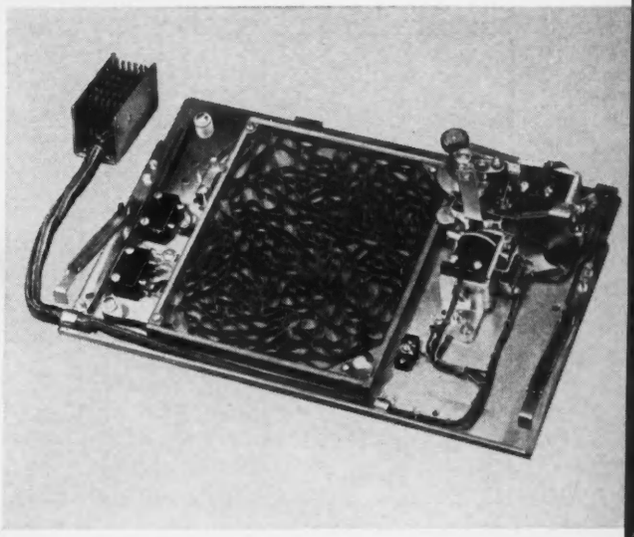
Each trunk circuit has its own tape recorder. Information is not delivered until off-peak hours, so that every trunk remains in continuous operation during high-traffic periods. And, besides this great flexibility of service, there's the added advantage that the subscriber "does the work"—with resulting and obvious savings in time and equipment.

ey... and here are 3 more

The only thing your people have to do is process the final subscriber bills. XY Toll Ticketing does everything—watches traffic automatically, clears recorders on a schedule basis, records data with equal ease on typewriters or cardpunching machines.

XY Toll Ticketing equipment can easily and economically handle all your toll recording problems, and save you floor space, too!

You'll worry less with XY Toll Ticketing, because it's an electronic system, with the advantages of low maintenance and high reliability for which electronic computers and other miracle machines are famous.



Build your profits with the tremendous capacity of XY Toll Ticketing. Your Stromberg-Carlson representative will gladly discuss its possibilities with you. Call or write today.

STROMBERG-CARLSON COMPANY

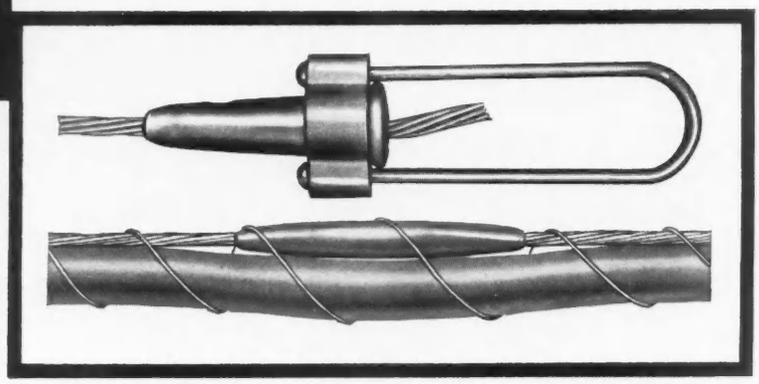
A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

Reliable STRANDVISES and STRANDLINKS simplify Strand installations . . . cut costs

. . . You can splice, reduce, terminate and false deadend

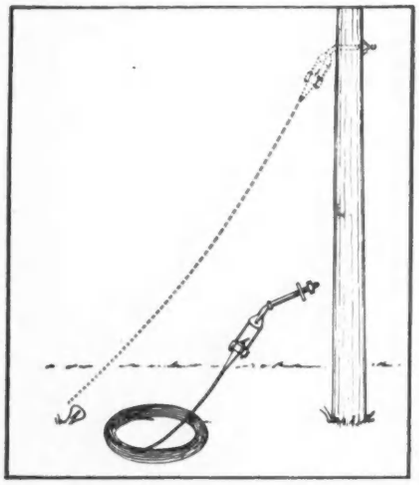
. . No problem with double or triple guys. . . Strandvise requires a minimum of working space



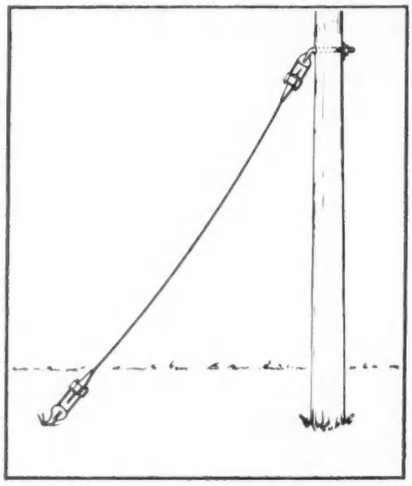
In 1949 there were six catalog numbers, today there are twenty-seven. Most of these new sizes and types were developed at the request of the Telephone Industry.

The reason — they're simple to install and easy to adjust.

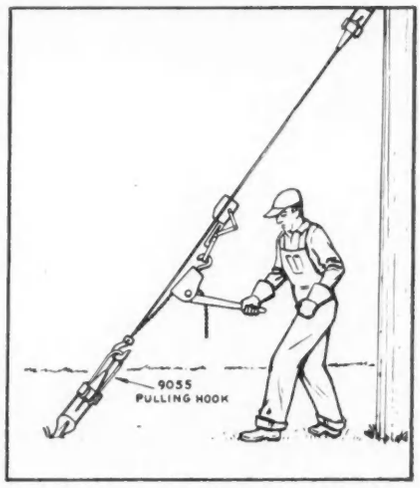
Just compare the Strandlink Strandvise method with any other way of installing Strand.



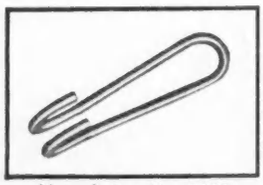
1 Assemble Strandvise to pole top hardware and complete pole top installation. Don't cut strand from coil.



2 Assemble Strandvise to anchor eye. Measure strand hand tight to capped end of Strandvise and cut. Insert strand and feed thru Strandvise hand tight.



3 Place come-along and hoist and apply tension.
Follow same procedure for double or triple guying to same anchor eye. Hoist and come-along need never be in the way.



New design No. 9055 pulling hook — easier to use.

Strandlinks—*the fastest splice known* for 3/16", 1/4", 5/16", 3/8" and 7/16" steel strand. Also for reducing 7/16" to 3/8" strand and 3/8" to 5/16" strand.

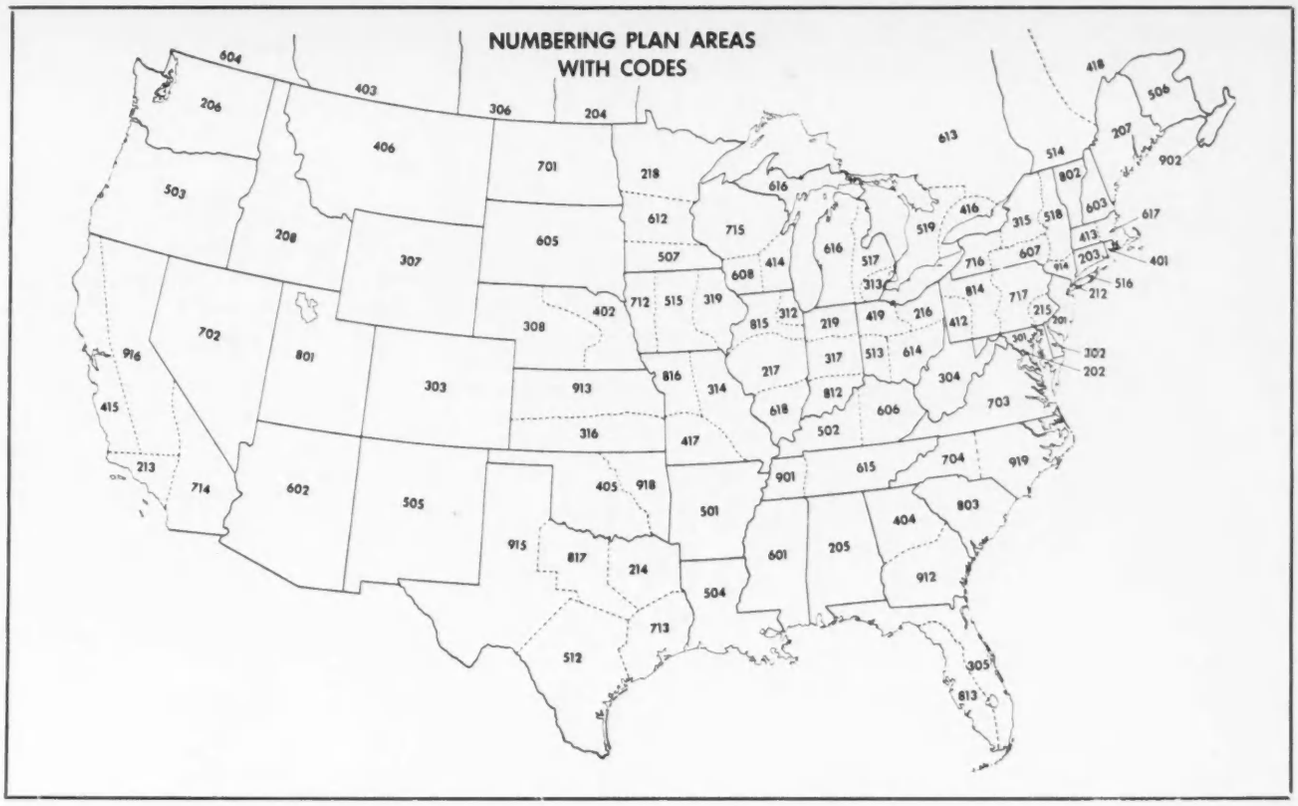
Strandvise—for 3/16" through 7/16" steel strand, all grades.
There are rigid and flexible bails for various guy attachments.

Write today for samples and detailed test reports

RELIABLE ELECTRIC COMPANY
3145 Carroll Avenue
Chicago 12, Illinois

Reliable
Telephone Protective and Terminal Equipment for all Station, Line and Central Office Needs.

Over 45 Years Service to the Utilities



The Independent Company

And Nationwide Toll Dialing

By L. A. HODSON

PART IV of Mr. Hodson's article discusses — signaling and transmission. Previous installments have covered code assignments and homing arrangements, equipment, testing facilities and trunk provision.

Signalling and Transmission

IN MANUAL ringdown operation signalling is relatively simple. Significant information is passed from one toll office to another, either verbally or by ringing on the line. With automatic switching, however, it will be necessary for a system of signals to be used, such as dial pulses, supervisory signals, tones, etc., which will carry all the essential information, which can actuate and be recognized by switching and transmission systems of many different types, and which must be capable of being accurately transmitted over the many different types of facilities used. The signalling system used must also be applicable during the transition period from manual to automatic operation.

Except for tones, which were dealt with in *Part III*, and multi-frequency dial pulsing which will be used to only a limited extent in the Independent field and will not, therefore, be dealt with in this article, signalling is accomplished by sending 'on hook' and 'off hook' signals to indicate the condition of the trunk circuit at the end from which the signal is sent. The terms 'on hook' and 'off hook' are derived from the signals received by the local central office from a subscriber's station. When the telephone receiver is on hook, the circuit is open. When the telephone receiver is off hook, the circuit is closed. To extend the terminology to the possible conditions of a toll trunk, if the trunk is not in use it is signalling 'on hook' towards the distant end. Seizure of the trunk at the calling end signals 'off hook' to the called end. While awaiting answer the called end signals 'on hook' to the calling end. When the called end answers, it signals 'off hook' to the calling end.

The signals used with automatic switching, together with their 'on hook' or 'off hook' conditions, where applicable, and the direction in which

they are sent are shown in *Figs. 9A-9B*. The significance of the signals is also determined by other factors as shown below.

DURATION — For example, a dial pulse is an 'on hook' condition lasting about 60 milliseconds. A ring forward signal is an 'on hook' condition lasting a maximum of 130 milliseconds. A disconnect signal is an 'on hook' condition lasting a minimum of 750 milliseconds. The release lags of intertoll switches and intertoll trunk terminations are arranged to be compatible with these durations so that the circuits will not release to any on hook signal except a disconnect signal of the proper duration.

RELATIVE TIME OF OPERATION — For example, a 'stop dial' off hook signal is returned by a link type C.D.O. or a step-by-step office in which the trunk is terminated on a line circuit, before any digits have been received, to indicate that the equipment is not ready to receive digits. A second 'off hook' signal is returned after all digits have been sent, when the called subscriber answers. The two 'off hook' signals, which are otherwise similar, are distinguished by their respective places in the signalling sequence.

FREQUENCY OF REPETITION — This applies to tones and flashes which are interrupted at different frequencies,

Name of Signal	On-Hook	Off-Hook	Direction: Calling End	Direction: Called End	Use or Meaning	Indication: To Customer	Indication: To Operator	See Note
Connect (Seizure)		√		→	Request service and hold connection	———	———	
Disconnect	√			→	No service is desired - Message is completed - Release connection	———	Answering cord lamp lighted	
Off-Hook (Answer)		√	←		Called party has answered - Charge timing begins and depends on this signal	———	Calling cord lamp dark	
On-Hook (Hang Up)	√		←		Called party has not answered - Line idle - Message is completed	———	Calling cord lamp lighted	
Delay Dialing (Delay Pulsing)		√	←		Called end not ready for digits	———	Start dial lamp dark	1
Start Dialing (Start Pulsing)	√		←		Called end ready for digits	———	Start dial lamp lighted	1
Stop		√	←		Some digits received - Called end not ready for further digits	———	Start dial lamp changes to dark	1
Go	√		←		Called end ready for further digits	———	Start dial lamp changes to lighted	1
Dial Pulsing (DP)	√	√	→		Indicates called number	———	———	
						———	———	
Key Pulse (KP)			→		Prepare receiving circuit for digits -			
Digits			→		Indicates called number	———	———	
Start Pulse (ST)			→		Indicates that all necessary digits have been sent			
Line Busy	√	√	←		Called line is busy	60 IPM tone	60 IPM flash of calling cord lamp	
Reorder	√	√	←		All paths busy - All local trunks busy - All toll connecting trunks busy - All NC trunks busy - Blockage in equipment - Incomplete digits	120 IPM tone	120 IPM flash of calling cord lamp	2
No Circuit (NC)	√	√	←		All intertoll trunks busy	30 IPM tone	30 IPM flash of calling cord lamp	
Ringing			→		Alerts called customer to an incoming call	Bell rings	———	3
Audible Ringing (Ringing Induction)			←		Called station is being rung or Awaiting operator answer	Ringing induction tone		

FIG. 9-A: — Interoffice Signals Required In Nationwide Dialing. (See Notes below FIG. 9-B.)

Name of Signal	On-Hook	Off-Hook	Direction: Calling End	Direction: Called End	Use or Meaning	Indication: To Customer	Indication: To Operator	See Note
Ring Forward (Rering)	✓		→	→	Recall operator forward to the connection	———	Steady or flashing cord lamp	
Ringback	✓		←	←	Recall operator backward to the connection	———	Lighted cord lamp for duration of ring	
Ringing Start			→	→	Starts ringing when terminating equipment is of controlled ringing type	———	———	
Flashing	✓	✓	→ ←	→ ←	Manually recall operator to the connection	———	Flashing cord supervisory lamp	
Coin Collect			← →	← →	To collect coins deposited in coin box	———	———	
Coin Collect Tone			→ ←	→ ←	Indicates that coin collect signal is being sent to coin box	———	Low tone	
Coin Return			← →	← →	To return coins deposited in coin box	———	———	
Coin Return Tone			→ ←	→ ←	Indicates that coin return signal is being sent to coin box	———	High tone	
Coin Denomination Tones			→ ←	→ ←	Indicate number and denomination of coins deposited in coin box	Tones from gongs in coin box		
Class of Service Tone			→	→	Indicate to operator the class of service of the calling customer's line	———	High, low or no tone	
Recorder Warning Tone			→ ←	→ ←	Indicates telephone conversation is being recorded	1400 CPS "Beep" Tone of 0.1 second duration applied every 14 seconds	———	
Announcements: Unassigned Code, Unassigned Number, Overload, Emergency			←	←	Inform customer or operator of reason why call has not been completed	Verbal		

FIG. 9-B: — Interoffice Signals Required In Nationwide Toll Dialing.

NOTES: —

(1) The start dialing, delay dialing, stop, and go signals are sometimes indicated to the operator on the calling cord lamp instead of the start dial lamp.

(2) It will be observed that conditions producing a 120 IPM signal apply to facilities that are relatively liberally engineered and, hence, the probability of an immediate subsequent attempt succeeding is reasonably good. The use of the 120 IPM signal to indicate the dialing of an unassigned area or office code is to be discontinued.

(3.) Ringing of the called station should be started automatically upon seizure of the called terminal.

30, 60 or 120 IPM, to indicate different meanings.

STEERING — This is linked to relative position of the signal in the chain of connection. For example the first 'off hook' signal referred to above would be steered to the sender in the originating office to stop pulsing, whereas the second 'off hook' signal would be steered to the charging equipment in the originating office, or to the originating operator, to start the chargeable timing of the call.

While the terms 'on hook' and 'off hook' have been derived from the simple opening and closing of a subscriber's loop, in toll signalling the signals may be transmitted by many different means, in accordance with the most economical method of signalling over the particular trunk concerned, for example:

(i) Opening or closing a D.C. loop.

(ii) Reversing the polarity of the circuit.

(iii) Changing the value of a bridged resistance.

(iv) E and M lead control in conjunction with:

(a) SX signalling.

(b) CX signalling.

(c) Single freq. signaling.

In deciding on the method of signalling to be used on new toll dialing circuits, complete co-operation is required between the companies owning the terminating offices to ensure that the particular requirements of the equipment in the terminating offices are satisfied.

With the exception of the few cases in which large volumes of traffic to Bell crossbar offices justify the installation of multi-frequency pulsing equipment, digit signalling from Independent offices will be by dial pulsing. Dial speed should be between limits of 9.5 and 10.5 pulses per second. Station dials should have a break ratio between limits of 58% and 64%. Switchboard dials should have a break ratio between 61% and 67%. The repetition of dial pulses through trunks and signalling circuits may cause shifts of the break ratio. The break ratio tolerances for a particular circuit will be shown on the circuit drawing.

Toll connecting trunks between class 4 and class 5 offices should terminate in the class 5 office on incoming selectors which will immediately return 'on hook' supervision, not on line circuits. Dial tone should not be applied to the trunks. In new offices and in existing step by step and certain types of relay offices this requirement can be met without difficulty.

In certain other types of relay offices, however, it is not possible to terminate the trunks on individual selectors which will permit immediate dialing.

In these cases, provision should be made to return a "stop dial" (off hook) signal when the line circuit is operated, and maintain it until a trunk has been seized and the circuit is ready for dialing. 'On hook' supervision should then be returned to enable the sender in the distant office to operate.

If an office of this type homes on a step by step toll center, the intertoll selectors in the toll center should be arranged so that when they step to the level corresponding to the office which returns 'stop' signal on seizure, they immediately return 'off hook' supervision, before rotary hunting begins.

The 'off hook' condition is maintained by the intertoll selector through rotary hunting, seizure of the outgoing trunk circuit, seizure of the incoming trunk circuit at the end office, seizure of the link, return of the 'off hook' signal by the end office, until the 'off hook' signal has been repeated back to the intertoll selector by the outgoing trunk circuit in the toll center.

The intertoll selector then removes, by the release of a slow release relay, the 'off hook' condition it has applied, the 'off hook' condition towards the calling end being maintained by the 'off hook' condition returned by the end office.

Normally, control of the holding and release of a connection is exercised by the calling party, and trunk circuits should operate accordingly. In some cases, toll connecting trunks are designed for joint control from either end. Such trunks should be arranged to:

(a) Have the toll center end of the trunk release the toll switching equipment in the toll center when the calling party disconnects and then,

(b) Make the trunk appear busy to incoming calls until the called party disconnects. The trunk busy should not be released if the called party flashes.

Two way trunks arranged for calling party control should have the following characteristics: —

(1) The called end should remove the answer 'off hook' signal immediately it receives a disconnect signal from the calling end. This prevents false seizure of calling end equipment.

(2) At the same time, the called end should restore to normal and be capable of receiving a new incoming call after an interval of 140 milliseconds to 750 milliseconds. The calling end must be guarded against re-seizure for a period in excess of 750 milliseconds to allow the called end equipment time to restore to normal.

Intertoll trunks using dial pulsing, other than loop pulsing, should pulse with the tip and ring of the trunk open, and an idle trunk termination applied to the line side of the open. The same conditions should apply when ringing over the trunk.

The ideal transmission arrangement would be to operate every circuit at zero loss, but echo and singing problems which are conditioned by the length of the circuits and the velocity of propagation of the media used to provide the circuits prevent the attainment of this ideal. The best practicable arrangement is to operate each circuit at the lowest possible transmission loss allowed by the length of the circuit and the type of facility used to provide it.

There are two types of circuit to be considered:

(1) Intertoll trunks — Which include the final trunks between a class 4 office and the office on which it homes, and the high usage trunks between the class 4 office and other class 4 or higher offices.

(2) Toll Connecting trunks — between a class 5 office and the class 4 or higher office on which it homes.

Intertoll trunks are operated at their Via Net Loss, which is the lowest practicable loss at which the circuit can be operated without causing unpleasant echo, crosstalk or singing. To facilitate the calculation of the VNL for a particular circuit Via Net Loss Factors have been established by relating the transmission characteristics of different types of circuits to the results of a statistical analysis of the tolerance of subscribers to echo. *See Table One.*

The calculation of the operating loss of intertoll trunks is complicated

FACILITY	VNLF (db per mile) 2 WIRE FACILITY	4 WIRE FACILITY
19H88 — 50 side	.03	.014
19H88 — 50 phantom	.03	.014
19B88 — 50 side	.04	—
19B88 — 50 phantom	.04	—
19H44 — 25 side	—	.01
19H44 — 25 phantom	—	.01
Open wire voice frequency	.01	—
Open wire carrier (all types)	—	.0017
Type K or N carrier	—	.0019
Type L carrier	—	.0015
Carrier circuits on radio	—	.0014
H88 on paired exchange type cables — any gauge	.04	—

To calculate the VNL for any trunk it is necessary only to multiply its VNLF by its length, and add 0.4 db to allow for expected variations from the assigned net losses. Subtracting this figure from the actual loss of the circuit gives the repeater gain required.

TABLE ONE: — Via Net Loss Factors for Typical Telephone Facilities

by the need to consider factors, such as office balance and the average return loss of the intertoll trunks connected to the office, which, because of lack of trained personnel, suitable testing equipment, and basic information, are normally beyond the scope of the smaller independent companies. The advice of the local Bell System Company should, therefore, be sought as to the measures to be taken to bring intertoll trunks up to standards required by nationwide toll dialing.

Toll connecting trunks are operated at Via Net Loss plus 2 db to a permissible maximum loss of 4 db. Where the actual loss is very small, as in the case of internal trunks between a class 4 office and a class 5 office in the same building, 2 db pads are inserted in the toll connecting trunks. Where the class 5 office is remote, the calculation is as described for intertoll trunks. For example, in the case of a 50 mile open wire voice frequency circuit, including one mile of entrance cable:

Via Net Loss = 50 x .01	= .5 db
Add 0.4 allowance	= .4 db
Add 2 db	= 2.0 db
Total	= 2.9 db

Actual Loss =

49 miles x .076 db/mile	= 3.8 db
1 mile x 1.2 db/mile	= 1.2 db
2 coils x .5 db	= 1.0 db
Total	= 6.0 db

Repeater gain required =
6.0 db — 2.9 db = 3.1 db.

The VNL plus 2 db design for toll connecting trunks will normally be sufficiently stable to make the use of idle line terminations unnecessary. If a trunk is found to be unstable when operated at the VNL plus 2 db loss, it is indicative that there is some structural irregularity in the circuit, perhaps in the loading spacing, or in the transposition, which should be corrected.

The national toll dialing switching plan allows up to ten links between end offices. It can be seen that excessive variations from the assigned losses on individual circuits may cause large positive or negative losses to accumulate in multi-switched connections, causing low volume or excessive echo. On many connections, an operator will not be present to observe the quality of transmission, and with customer dialing and automatic alternate routing it will be practically impossible to identify a faulty circuit. The transmission plan has been designed on the assumption that the variation from the assigned loss, VNL or VNL plus 2 db, on any circuit will be strictly limited. Careful maintenance will be necessary to meet this requirement. To operate the toll system successfully, it will be necessary to have well trained personnel, adequate test equipment and an appreciation that trouble can only be cleared successfully by eliminating the basic cause, not by making terminal gain adjustments to remove the symptoms.

The transmission design of the subscriber's loop is as important to the nationwide toll dialing plan as the design of the intertoll and toll connecting trunks. A paper, "Simplified Transmission Engineering in Exchange Cable Plant Design," by L. B. Bogan and K. D. Young, AIEE Transactions, Vol. 73, Part I, 1954, page 498, gives the proper method of designing exchange distribution plant. For the small exchanges which comprise the greater part of the Independent section of the Industry, however, a rule of thumb zoning of telephone instruments shown below should meet practical transmission requirements.

Subscriber loops up to 400 ohms— Instruments of the Western Electric type E1A or equivalent may be used.

Subscriber loops from 400 ohms to 800 ohms — Instruments of the Western Electric type 300 or 500 type or equivalent should be used.

Subscriber loops from 800 ohms to the limit set by the signalling and supervisory limitations of the central office equipment, as specified by the manufacturer — Instruments of the Western Electric type G1A (500 type) or equivalent should be used.

Instruments equivalent to the Western Electric type 500 telephone will give satisfactory transmission on loops up to 1500 ohms. If this type of telephone is purchased exclusively in the future, it will not only enable considerable savings to be effected in the cost of future distribution cables, but will also enable advantage to be taken of any future improvement in the resistance limit set by the switching equipment, which is now usually about 1000 ohms. —

To Be Continued.

The permission of the American Telephone and Telegraph Co. to use material from the "Notes on Nationwide Dailing" is gratefully acknowledged.

Send A Copy To Your Friends

. . . . . Without Charge

TELEPHONE ENGINEER
PUBLISHING CORP.
7720 N. Sheridan Rd.
Chicago 26, Ill.

Please send a free copy of the Jan. 1956, issue of TELEPHONE ENGINEER & MANAGEMENT with my compliments to the persons listed below.

To _____
Address _____
City _____ State _____

• • •

To _____
Address _____
City _____ State _____

• • •

To _____
Address _____
City _____ State _____

• • •

To _____
Address _____
City _____ State _____

• • •

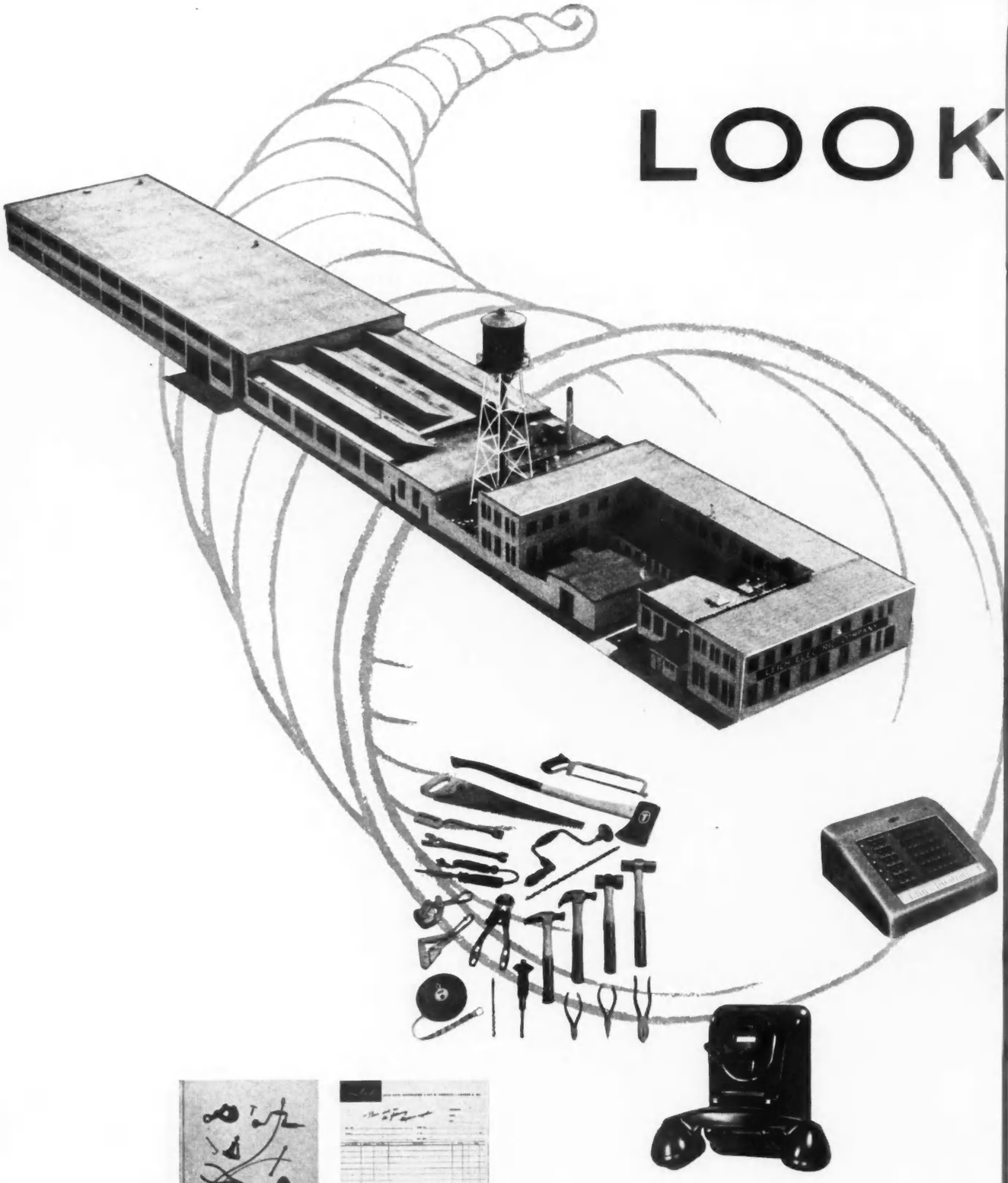
To _____
Address _____
City _____ State _____

• • •

To _____
Address _____
City _____ State _____

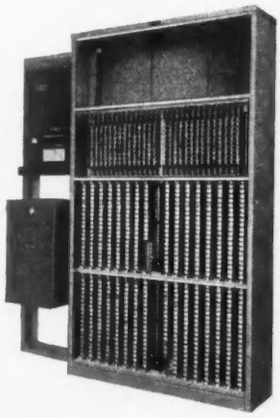
Sender _____
Company _____
Address _____

LOOK



LEICH

TO LEICH...



FOR RELIABLE TELEPHONE EQUIPMENT, MATERIALS AND SUPPLIES

Reliability is the key to good telephone service. Everyone, from the subscriber's deaf grandmother to the president of the telephone company knows this.

Here at Leich we know how important it is for you to have equipment and supplies you can depend on.

That's why Leich equipment is so soundly engineered, why we use the highest quality materials in building it.

And that's why Leich supplies and construction materials are selected so carefully, are made by famous manufacturers.

You can depend on Leich for the materials that will help you give good, reliable telephone service. And you can depend on us, too, for the kind of helpful service you need to get your job done on time. Try LEICH.

ANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907
ICH SALES CORPORATION 427 W. RANDOLPH STREET CHICAGO 6, ILLINOIS
CIFIC COAST: 11401 WEST PICO BLVD., WEST LOS ANGELES 64, CALIF. SOUTHWEST: 1227 SLOCUM ST., DALLAS 7, TEXAS

Junction Transistors and Diodes for Power Regulation

By F. H. CHASE

SINCE THEIR announcement by the Laboratories in 1948, transistors have found many uses in communications, computers, and military equipment. Through the efforts of the Laboratories, new and better types of transistors are continually being produced to fulfill various circuit requirements.

ALTHOUGH semiconductor devices have found widespread acceptance in communication and computer circuitry, little mention has been made of their possible uses in power conversion and regulation. Most Bell System circuits require dc, and since power companies today usually provide only ac, it is necessary to convert what is available to what is ultimately used. Although electron-tube, selenium, and coper-oxide diodes have been used for power conversion, the resulting dc must usually be closely regulated, and only electron-tubes have been employed with any success for power regulation.

Semiconductor diodes and triodes, stemming from early research by the Laboratories, offer a possible "new look" in power conversion and control circuits. For each power conversion circuit using electron-tube, selenium, or copper-oxide diodes, there is a similar — usually more efficient — circuit using power-sized junction diodes. Likewise, for each power regulation circuit using tubes, there appears to be a similar — usually simpler — circuit using control-sized junction diodes and triodes.

The particular devices of interest are junction transistors and silicon junction diodes, both based on the solid-state physics of semiconductor junctions. These have been described

in detail previously, but a brief resume of their characteristics pertaining to power control circuits is included here. In the illustration at the head of this article, the author points out to F. W. Anderson how a transistor-regulated power supply has replaced a bias battery in a thyratron power supply.

Certain semiconductors, primarily germanium and silicon, can be "grown" into large single crystals under closely controlled conditions. The electrical characteristics of the crystal can be changed by the addition of certain impurities, with two general types of semiconductor resulting — *n*-type and *p*-type.

The two types both conduct electricity, but in different ways; when an abrupt change from one type to the other occurs within a crystal a rectifying junction is formed. Such a *p-n* junction will conduct readily from *p* toward *n* but offers a high resistance to current in the opposite direction — it has a low forward resistance and a high reverse or "back" resistance. Provisions must be made to keep the temperature below critical limits — aproximately 70°C for germanium and 200°C for silicon.

A silicon junction diode has an extremely high back resistance within its normal operating current range. If, however, the current is increased, a region will be reached where the voltage drop across the diode, *Figure* 1, becomes almost constant for a wide range of currents. This "saturation" voltage, since it is nearly constant, may be used as a standard of reference for voltage; a diode so operated is a reference-voltage diode.

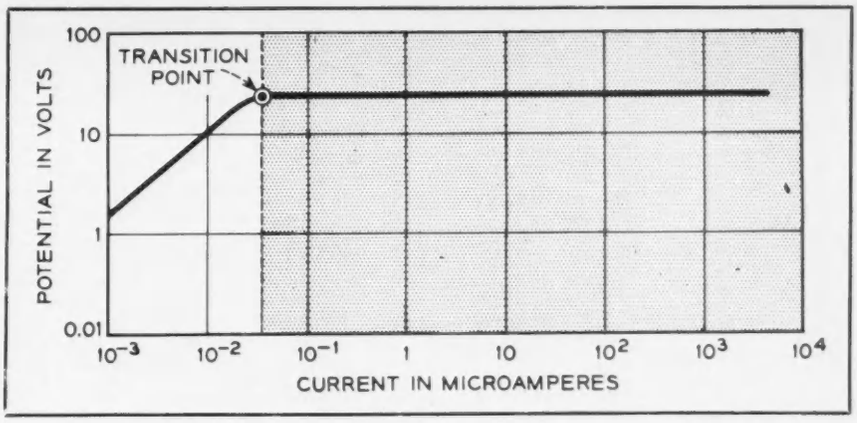


Fig. 1—Reference-voltage diode characteristics.

A crystal grown with a thin wafer of one type interposed between two sections of the opposite type may be used as a junction transistor. Depending on the crystal formation, the transistor may be *n-p-n* or *p-n-p*.

To correspond with point-contact transistor nomenclature, the end sections are called emitter and collector and the connection to the central wafer is called base. The characteristics of both types of junction transistors are the same except for reversed polarities. Circuits designed for one type may be used with the other type if the polarities are changed, and these two types of junction transistors are thus said to have "reversed" symmetry. This reversed symmetry permits considerable flexibility in the design of power regulation circuits using transistors.

For purposes of power regulation, transistor action need only be considered as current multiplication. The power regulation circuits described use transistors as "grounded-emitter" current amplifiers, permitting the simplified diagram of *Figure* 2 to be used in interpreting their operation. This diagram characterizes transistors by means of a "two-rectifier" analogy. Although a transistor may be somewhat over-simplified by this analogy, it permits the power engineer to approximate transistor operation on terms with which he is very familiar. Experience in circuit development has proved that the analogy is valid where transistor operation as a dc amplifier is of interest.

Whichever type of junction transistor is used, a *p-n* junction rectifier occurs between emitter and base and another between collector and base. With a battery connected to the collector and emitter terminals, a current flows through both rectifiers in series — through the emitter rectifier in its forward direction, but through the collector rectifier in its reverse direction.

If a second battery is applied between base and emitter, a second forward current flows through the emitter rectifier and transistor action takes place. This action is equivalent to dividing the collector reverse resistance by approximately the current gain of the transistor. Variations in base current then appear as amplified current variations in the collector circuit.

Two things are necessary in power-regulating circuits; a constant reference voltage with which the power-circuit voltage may be compared, and a circuit element having controllable characteristics. A reference-voltage diode provides a constant voltage; a junction transistor has controllable characteristics. Thus, these two de-

Please Turn To Page 51

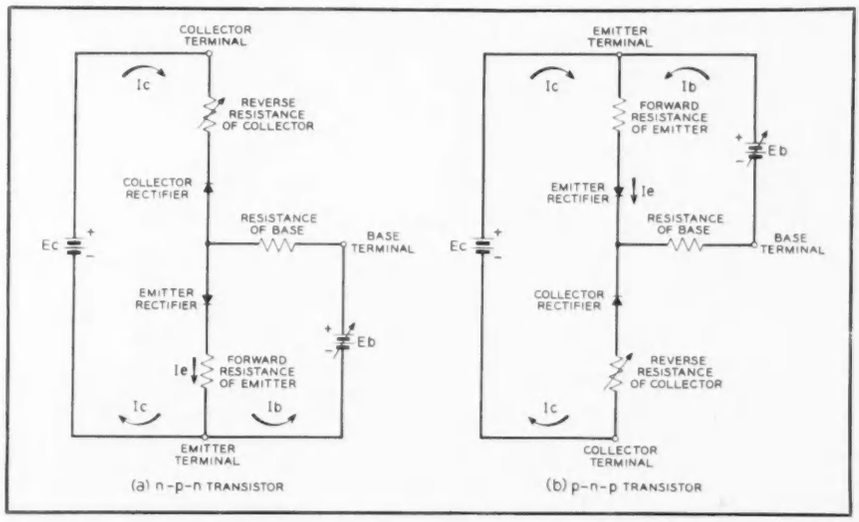


Fig. 2—For power purposes, the two junctions of a transistor may be thought of as simple rectifiers. Left, n-p-n transistor, right, p-n-p transistor.

Telephone by Automatic Electric

Touch of luxury... for pennies!

Less than you pay for the daily papers puts an extension telephone within your reach. In bedroom, kitchen, den, few of the comforts of home cost so little, fit today's relaxed living so well. Extension telephones are one item from a growing list of telephone service *extras* offered by Independent companies. To America's 5,000 Independents, making telephone service more convenient... more useful in every way... is just as important as providing it.

When you order an extension, remember to ask about colored telephones.

INDEPENDENT

Independent Telephone Companies of America

United States Independent Telephone Association • Pennsylvania Building • Washington, D.C.

Junction Transistors And Diodes

(Continued From Page 49)

vices can be used in several types of power-regulating circuits.

A shunt regulator is a variable resistance circuit shunted across a load, wherein both the shunt element and the load draw current through a common resistance. As load-current requirements decrease, the shunt element draws more current; if load requirements increase, the shunt element draws less current.

The net result is a practically constant total current and hence a constant output voltage. A familiar example of this type of regulation is the use of a gas-tube as the shunt element. Here, the output voltage is the ionization voltage across the gas-tube.

A referenc-voltage diode is the semi-conductor equivalent of such a gas-tube, and may be used in exactly the same way to provide a constant output voltage. Unfortunately, the regulated output voltage is the saturation voltage of the diode and cannot be adjusted to any other value. *Figure* 3 shows a shunt regulator circuit where the output voltage is made adjustable by the addition of a transistor as a control element. A shunt regulator is used in the power supply shown in the headpiece.

An *n-p-n* transistor is used as a current amplifier, its emitter current also flowing through a reference-voltage diode. The effective base-to-emitter voltage is then that portion of the output voltage appearing across the lower part of the potentiometer, minus the constant voltage across the diode. With the base slightly positive with respect to the emitter, an increase in output voltage will increase the base-to-emitter voltage and therefore the base current.

The collector current is the shunt regulating current, and will increase by an amount equal to the base-current change multiplied by the current gain. The increased shunt current in turn causes a larger voltage drop across the series resistance, lowering the output voltage. Similarly, a decrease in output reduces the base current, reduces the collector current much more, and increases the output.

The regulation possible with such a circuit is primarily determined by the constancy of the reference volt-

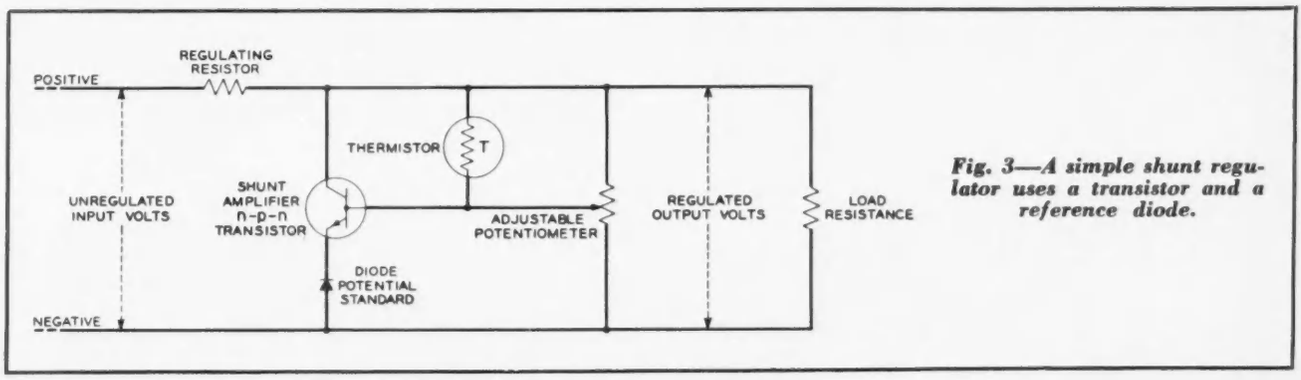


Fig. 3—A simple shunt regulator uses a transistor and a reference diode.

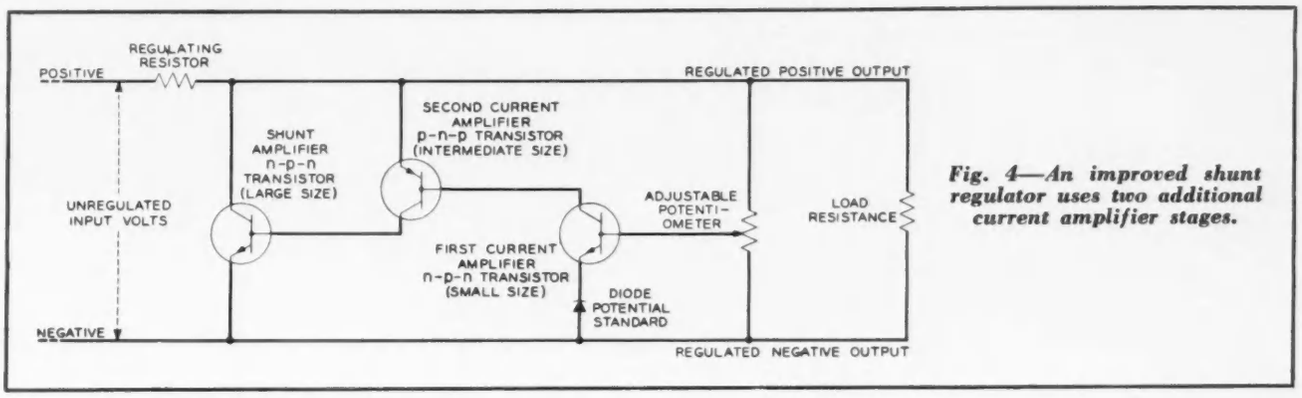


Fig. 4—An improved shunt regulator uses two additional current amplifier stages.

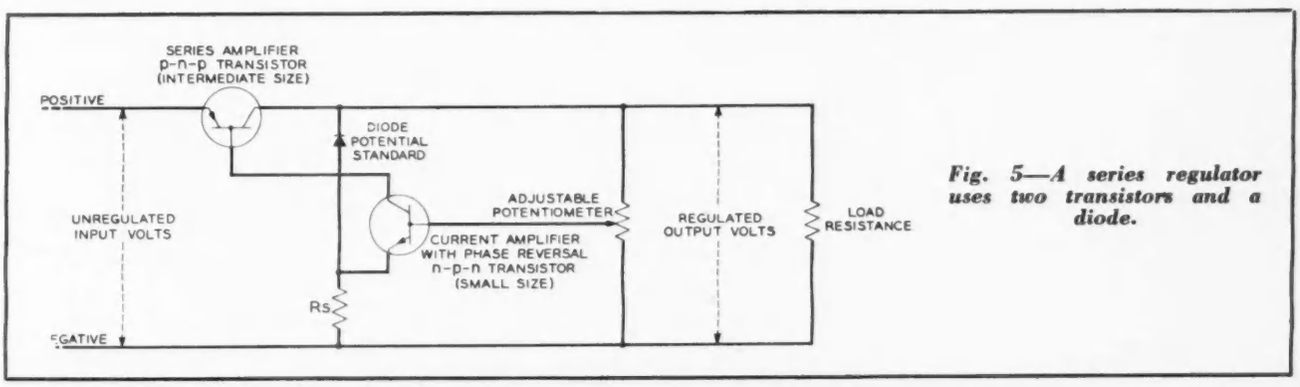


Fig. 5—A series regulator uses two transistors and a diode.

you'll be
proud
of...
your
smart
new
two tone color
telephone!

AVAILABLE
WITHOUT CHARGE
for all your subscribers

Here Is Automatic's new TWO-TONE MONOPHONE ENVELOPE STUFFER!

This beautiful 4-color folder, designed to attract subscriber interest in two-tone telephones, will be provided in the quantity you require —AT NO COST TO YOU. Figure now what you need to send out with your monthly bills. Let us know. We'll get them to you as quickly as possible.

AUTOMATIC ELECTRIC

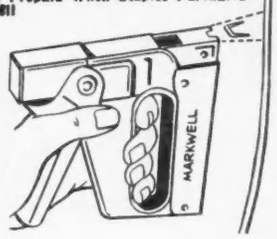
ORIGINATORS OF THE DIAL TELEPHONE

MARKWELL TELEPHONE TACKER

SAVE OVER 50%
LABOR & MATERIAL

MARKWELL FREE SERVICE

Factory Service and Over-haul at No Charge and Returned Prepaid When Staples Purchased From Markwell



ONLY $11.95

"HOLDS WIRE SAFE AND SECURE"

For "JK" Wire .....Use L3B 5/16" Staples
Up to 11 Strand Cable Use L3M 7/16" Staples
Up to 16 Strand Cable Use L3D 9/16" Staples

OTHER USES — Stapling Drop Wire, Metal Numerals, Signs, Screens, Building Repairs and Maintenance, Etc.

SIZE	5 per pkg.	15 per pkg.	30 per pkg.
L3B 5/16" Leg	$2.75	$2.50	$2.25
L3M 7/16" Leg	2.90	2.75	2.50
L3D 9/16" Leg	3.10	2.95	2.70

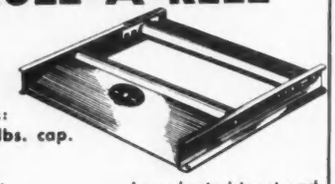
STAPLES PER PKG. — 5000 . . . Sizes Can Be Assorted For Quantity Price . . . Discounts In Larger Quantities.

MARKWELL MFG. CO., INC.
Established 1919
Industrial Products Div.—Dept. 77
200 Hudson St. New York 13,N.Y.

Simple as

Handle heavy reels easily and safely; remove wire or cable from top or bottom, front or back of reel with

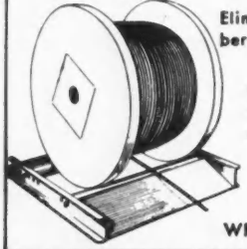
ROLL-A-REEL



Style A:
2,000 lbs. cap.
37.50
Style B:
4,000 lbs. cap.
75.00
F.O.B. Cincinnati

Low slanted front and positive front lock insure quick loading or unloading.

Eliminate jacks, cumbersome handling.



Carried easily to reels, job or storage.

WRITE FOR DETAILS

ROLL-A-REEL
1100 SYCAMORE AT CENTRAL PARKWAY
CINCINNATI 2 OHIO

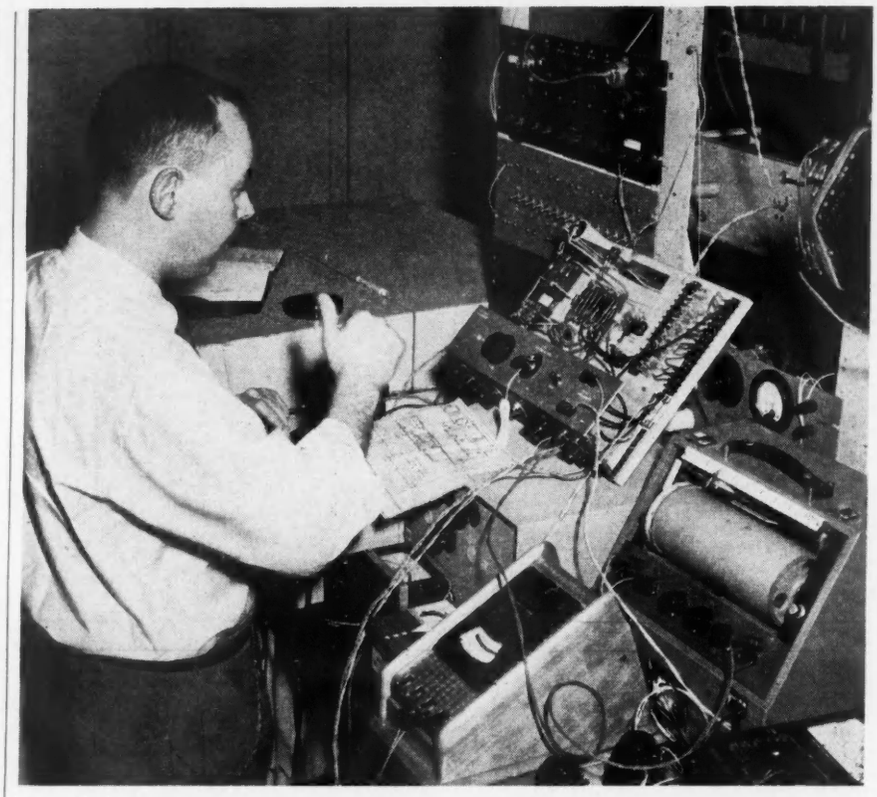


Fig. 6—Tests on a power supply are made using a series current regulator. J. J. Wilson checks the circuit.

age. Although the voltage across a reference-voltage diode is nearly constant, it does change very slightly with changes in current or ambient temperature. Adding a transistor does not improve the regulation; it merely provides a means of adjusting the output voltage to a value other than the saturation voltage of the diode. The range of adjustment, of course, is determined by the maximum safe voltage that may be applied between emitter and base. A properly chosen thermistor may be connected across the upper part of the potentiometer, to offset any variations arising from changes in the ambient temperature. Although this temperature correction is not shown on succeeding figures, it may be used with any transistor-diode regulator.

In *Figure* 4, two more transistors have been added to the circuit of Figure 3 to improve regulation. The transistor where the output potential is compared to the reference potential is now called the first current amplifier. Except for the collector connection, its operation is identical with that of the shunt transistor amplifier in *Figure* 3. However, collector current for this first *n-p-n* transistor is also the base current of the *p-n-p* transistor in the second amplifier. This results in current amplification in both transistors, because of their reversed symmetry.

A similar connection is used between the collector of the *p-n-p* transistor and the base of the *n-p-n* shunt transistor amplifier. This third stage of current amplification is called a shunt transistor amplifier because its collector current, flowing through the series resistance, is the variable shunt current that regulates the ouput voltage. Now, base current variations in the first current amplifier are multiplied by the current gain of this *n-p-n* transistor, again by the current gain of the *p-n-p* transistor, and a third time by the current gain of the final *n-p-n* shunt transistor to obtain the shunt regulating current.

The total current gain is, for all practical purposes, equal to the product of the current gains in each of the transistors. The circuit shown in *Figure* 4 is a better regulator than that of *Figure* 3 because of this added amplification, and because only a small fraction of the variable shunt current flows through the reference-voltage diode.

In *Figure* 4, different sizes are specified for the three transistors. The small *n-p-n* transistor shown for the first current amplifier might be one that will safely carry a maximum

Please Turn To Page 56

NUMBER 17
Toll grade. These insulators are employed for all exchange circuits and for all toll and trunk circuits that do not exceed ten miles.

Dependable ...in emergencies

When they're on the line, you can *depend* on their strength and uniform high quality.

When you order you can *depend* on prompt deliveries of what you need . . . when you need it.

Since 1870, when Robert Hemingray began mass production of screw-thread insulators, Hemingray has pioneered most of the insulator developments to keep pace with the requirements of the communication systems of the world.

Today, as always, Hemingrays are world standard for quality, and most of the overhead telegraph and telephone lines of the world are carried on *dependable* Hemingray Glass insulators. They are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

HEMINGRAY INSULATORS
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

Thompson Field Research, the most extensive in the industry, now tells you the best way to destroy all mixed brush and hardwood growth during the dormant season . . . effectively . . . economically.

Thompson's proven spray techniques and its Broad Spectrum Bramblcide deliver almost complete kills at unequalled low cost.

In addition to the economy, and better employment of manpower, dormant season basal bark control (and stump treatment) is free from the possibilities of danger to susceptible crops and helps to further public good will.

Many of the world's largest users of herbicides specify Thompson, one of America's few basic manufacturers of selective herbicides. Inquire.

Write for Research Station Papers No. 19 and 21, mentioning type of brush to be controlled and number of miles of right-of-way involved. Favorable utility chemical prices submitted on request.

Thompson Chemicals

THOMPSON CHEMICALS CORP.
St. Louis 3, Mo. • Los Angeles 27, Calif.

FIRST NAME IN BRUSH KILLERS

collector current of 5 milliamperes. Then the allowable base current of the *p-n-p* transistor cannot exceed 5 milliamperes and, with an assumed current gain of 20, its maximum collector current will be 100 milliamperes. Such a transistor is not yet commercially available.

With 100 milliamperes of base current in the large *n-p-n* transistor, and a current gain of 20, the shunt current will be a maximum of 2 amperes. Two amperes of shunt current will regulate a small-sized power plant but, as far as is known, transistors handling this amount of current are not yet commercially available. For opposite polarity, the circuits of Figures 3 and 4 can be modified to use the reversed types of transistors.

Shunt regulator circuits are good voltage regulators, but series regulator circuits are usually more efficient. A shunt regulator wastes its shunt current plus the voltage drop across its series resistor, whereas a series regulator wastes only the voltage drop across its series regulating device. Under light loads, the power dissipated in a shunt circuit is usually greater than that in a series device. With a transistor as the series device, this difference in efficiency is more pronounced because of the small collector voltage that can be used. This collector voltage, as shown in Figure 5, is the voltage drop across the series transistor.

Figure 5 is a simple transistor series regulator circuit, similar to *Figure* 4, but with the *p-n-p* transistor in the second current amplifier connected in series with the load so that its collector current is the load current. Comparison of the output voltage to the reference voltage in the first current amplifier is the reverse of that used in the first current amplifier of Figure 4. The emitter is held at a fixed potential with respect to the positive output rather than the negative output. This change in the reference-voltage connection results in a phase reversal of the base and collector current variations.

The potentiometer is adjusted so that the base of the first current amplifier is slightly positive with respect to its emitter as before. Now, when the output potential increases, the base-to-emitter potential, the base current and the collector current all decrease. This collector current is multiplied by the current gain of the *p-n-p* series transistor to decrease the load current, reduce the output voltage, and thus regulate it. The ohmic value of the Rs resistance keeps the current through the reference-voltage diode within its saturation voltage range while the potentiometer adjusts the output voltage.

In *Figure* 5, the series transistor is inserted in the positive lead; this circuit can be modified to insert the series transistor in the negative lead by using reversed-type transistors. The simplest form of transistor series regulator, Figure 5, requires two transistors whereas the simplest shunt regulator, Figure 3, uses only one transistor. But, the added current gain of the second transistor results in better regulation, and this can be further improved by additional transistors as in Figure 4.

A transistor series regulator that will regulate for constant output current instead of constant voltage is shown in *Figure* 6 and 7. In this circuit, the load current produces a voltage drop across the regulating resistor and, in the *p-n-p* transistor, this voltage drop is compared to the reference voltage.

The difference between these two

The Author

F. HAROLD CHASE entered the Bell System at Western Electric's Hawthorne Works in Chicago, while attending the University of Illinois. After receiving the degree of B. S. in Electrical Engineering in 1921, he transferred to the Engineering Department at West Street in New York City, which subsequently became the Laboratories. After doing design work on type-C and type-D carrier, he wrote maintenance practices on toll equipment and for a time was supervisor of a central office maintenance instruction group. Mr. Chase joined the power engineering group in 1943 where he was concerned with the development of power equipment. Since 1951 he has been developing new uses for transistors in the control of power equipment.

potentials controls the *n-p-n* transistor base current; this base current is multiplied by the current gain of both transistors to produce the load current. The regulated load current value can be varied by using an adjustable regulating resistor. Additional current-amplifier stages can be included, or the circuit can be modified to use the series transistor in the negative lead by using reversed type transistors.

Transistors can directly control small amounts of dc power but, with transistors now available, only moderate voltages and moderate currents can be controlled. Where regulation of higher power is required, it is necessary to combine transistor circuits with other devices.

Figure 8 shows an *n-p-n* transistor used as a voltage amplifier with a magnitude-controlled thyratron tube rectifier. Comparison of the output voltage to the reference voltage is the same as in *Figure* 3 and an increase of output voltage results in an increase of collector current. This collector current flows through resistance Rc and the resulting voltage drop across Rc is used as a negative grid voltage for the thyratron tube, to control its firing point. An increase in output voltage will delay firing of the tube until later in its conducting half-cycle, to reduce the output voltage.

Transistor circuits also may be combined with magnetic amplifier devices to control high power outputs. This is a useful combination for aplipcations where a high-speed response is not required, since the amount of power that can be controlled may be much larger than for any of the methods previously described. Figure 9 illustrates a constant-voltage regulated circuit; a similar circuit will regulate for constant current output.

The transistor circuit is very simi-

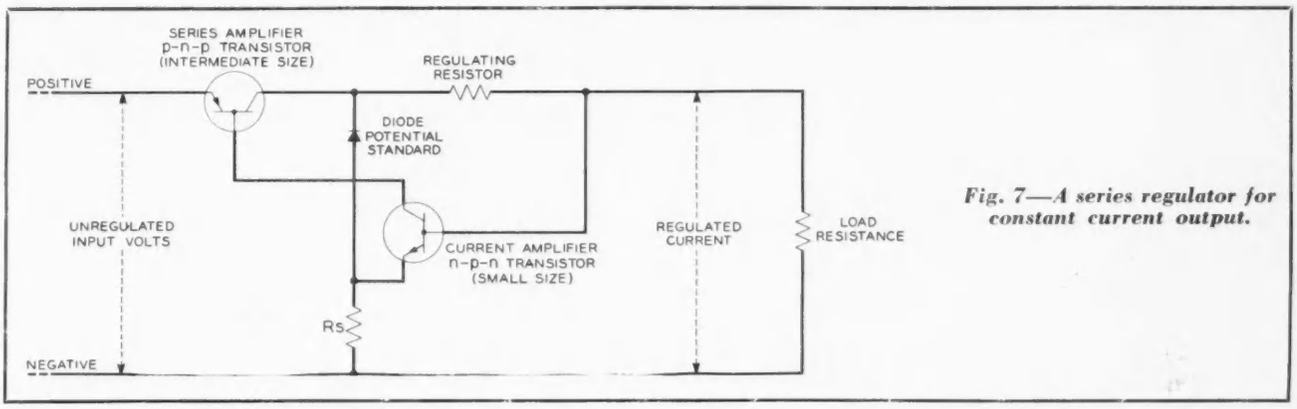


Fig. 7—A series regulator for constant current output.

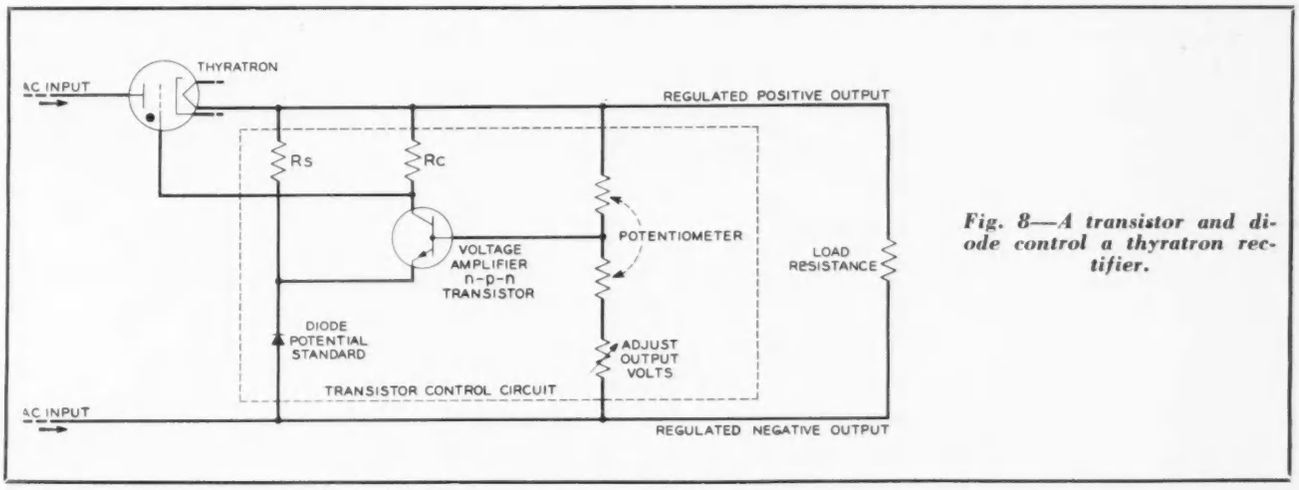


Fig. 8—A transistor and diode control a thyratron rectifier.

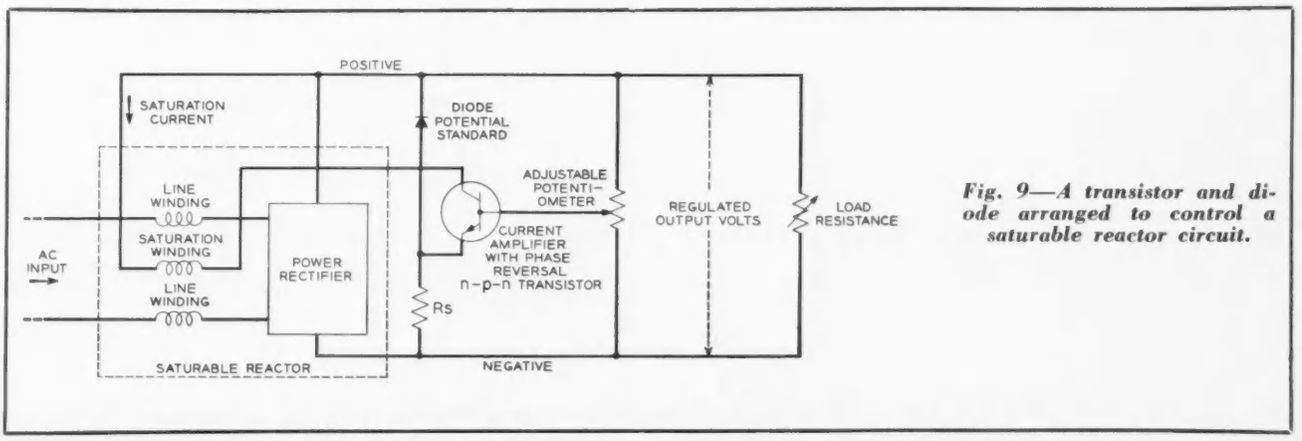


Fig. 9—A transistor and diode arranged to control a saturable reactor circuit.

A FAMOUS VOICE BRINGS A FRIENDLY RESPONSE

"The Voice With a Smile" is one of many things that America's telephone companies have in common. The combination of this friendly voice, and friendly public response, makes good telephone service even better. The advertisement across the page reminds millions of readers of January magazines of the pleasant relationship between those who enjoy fine telephone service, and those who provide it.

"The Voice With a Smile"

Miss Service Representative
"The Voice With a Smile" in the telephone Business Office

One of the nicest things about telephone service is "The Voice With a Smile." It runs all through the business.

Millions of times a day the operators send it singing over the wires. You hear it when you visit the Business Office or telephone the service representative.

The installer brings it to your home when he comes to put in telephones. The lineman has it as he works along the road or gives you the right of way at a busy intersection.

In talking about telephone people and the way they go about their work, we'd like to say a good word for you, too.

For it's your friendliness that helps us do the kind of job you want us to do. And that means better service for everybody . . . all along the line.

BELL TELEPHONE SYSTEM

CHANCE PLATFORMS

reduce fatigue . . . make work areas more accessible

Here's the platform that puts your linemen at ease high above the ground because it is the strongest, safest, sturdiest platform available anywhere. It makes work, away from the pole, more accessible and reduces lineman fatigue on prolonged jobs.

Has these Saftey Features:

Safety Locking Chain Tightener—attaches quickly and easily . . . locks securely so that platform can't be loosened accidentally. **Grip-Tread Surface**—platform is topped with Goodyear Grip-Tread for a safe, sure footing. **Superior Strength**—platforms are made from carefully selected Douglas Fir boards . . . each board is individually tested before shipment. **End Cleats for Added Safety**—end cleats show lineman his position on the platform.

The Chance Utility Platform, a 30-inch lightweight platform tested for 750 pounds, is ideal for telephone line splicing or similar time consuming jobs. Longer, adjustable or pivot platforms are also available from your Chance Distributor.

CT55-14

ABC INDUSTRIES

A·B·CHANCE CO·

CENTRALIA, MISSOURI

San Francisco, California

lar to the first current amplifier in *Figure* 5. Comparison of the output voltage to the reference voltage is identical as is the phase reversal of base and collector current variations with respect to output voltage variations. Collector current flows through the saturation winding of a three-winding saturable reactor; the phase reversal decreases the saturation current whenever the output voltage increases.

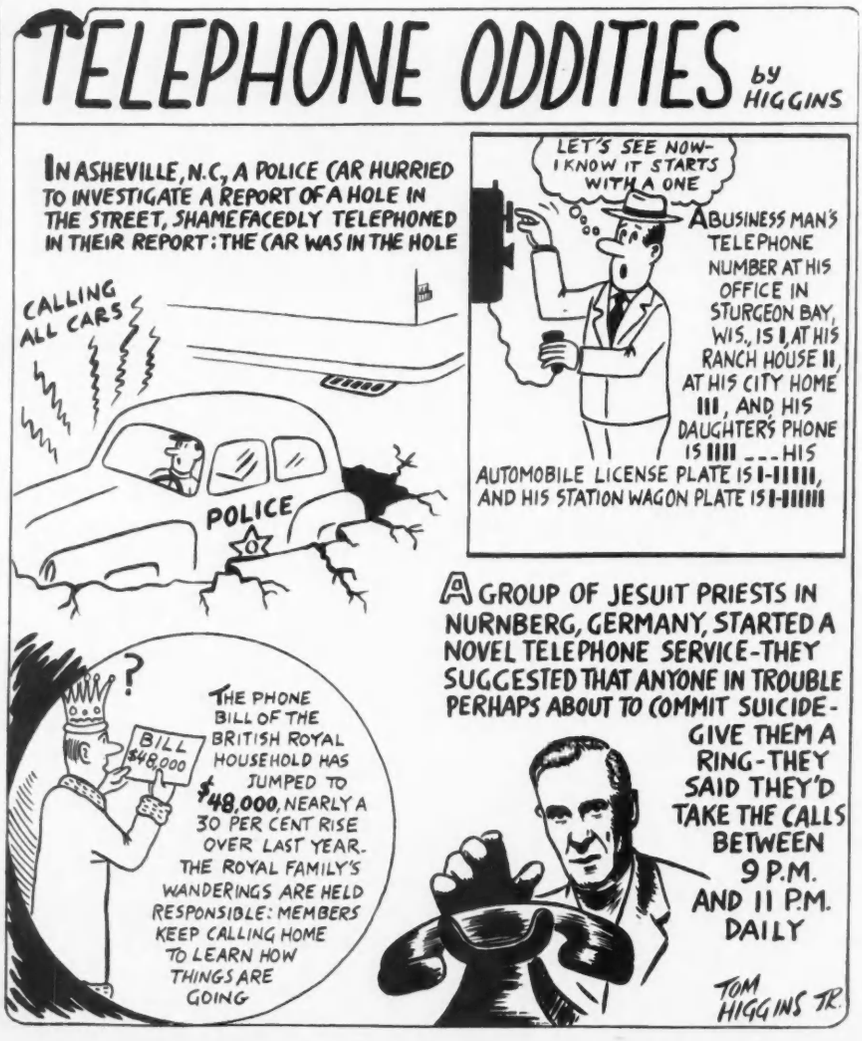
In the saturable reactor circuit, decreased saturation current produces a decreased ac voltage at the rectifier input, regulating the output potential. A change in output voltage does not instantaneously produce a change in saturation current; this is characteristic of all saturable-reactor regulating circuits. Delay in the transistor can be neglected.

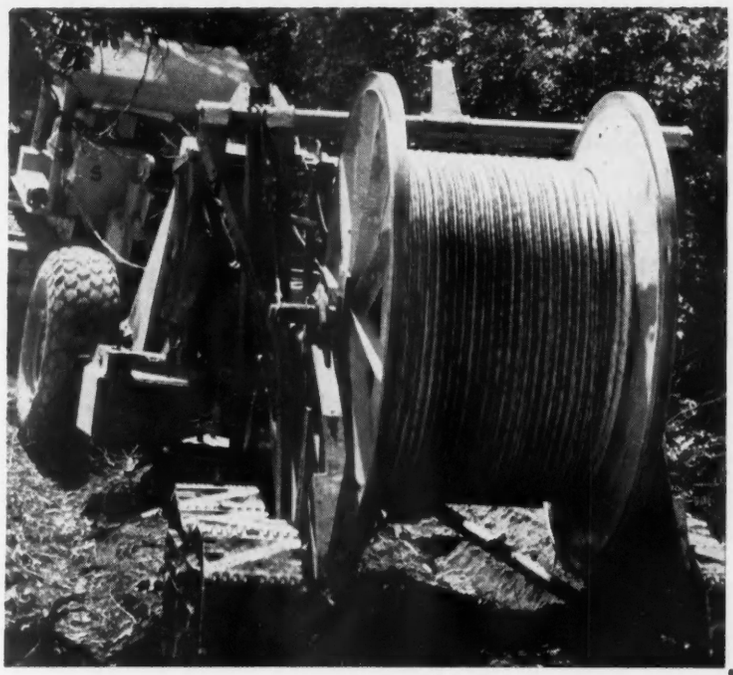
Additional amplification to improve regulation can be added to Figure 9 in two ways; transistor current amplified stages can be added as in Figure 4 or magnetic amplifier stages can be used. Additional magnetic amplifier stages will further lower the speed of response; the delay of several transistor stages is negligible compared to that of the saturable reactor.

A saturable-reactor regulated rectifier with constant output current can be obtained by using the *n-p-n* current amplifier stage of *Figure* 6 in place of the *n-p-n* stage of Figure 9.

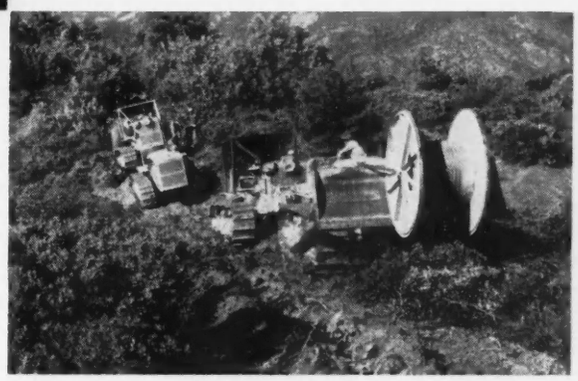
These are only some of the methods by which transistors can be used to regulate dc power. Many other circuits have been worked out but, in general, they are modifications of those described. Of course, use of these circuits depends upon the availability of proper transistors and reference-voltage diodes. Although these devices are still in the early development stages, specific circuits are now being designed for five power projects where the use of transistors seems particularly desirable. — ***F. H. Chase.***

Reprinted from "Bell Laboratories Record," September, 1955.


TELEPHONE ODDITIES by HIGGINS
IN ASHEVILLE, N.C., A POLICE CAR HURRIED TO INVESTIGATE A REPORT OF A HOLE IN THE STREET, SHAMEFACEDLY TELEPHONED IN THEIR REPORT: THE CAR WAS IN THE HOLE
CALLING ALL CARS
POLICE
LET'S SEE NOW- I KNOW IT STARTS WITH A ONE
A BUSINESS MAN'S TELEPHONE NUMBER AT HIS OFFICE IN STURGEON BAY, WIS., IS I, AT HIS RANCH HOUSE II, AT HIS CITY HOME III, AND HIS DAUGHTER'S PHONE IS IIII ---HIS AUTOMOBILE LICENSE PLATE IS I-IIIII, AND HIS STATION WAGON PLATE IS I-IIIIII
A GROUP OF JESUIT PRIESTS IN NURNBERG, GERMANY, STARTED A NOVEL TELEPHONE SERVICE-THEY SUGGESTED THAT ANYONE IN TROUBLE PERHAPS ABOUT TO COMMIT SUICIDE- GIVE THEM A RING-THEY SAID THEY'D TAKE THE CALLS BETWEEN 9 P.M. AND 11 P.M. DAILY
BILL $48,000
THE PHONE BILL OF THE BRITISH ROYAL HOUSEHOLD HAS JUMPED TO $48,000, NEARLY A 30 PER CENT RISE OVER LAST YEAR. THE ROYAL FAMILY'S WANDERINGS ARE HELD RESPONSIBLE: MEMBERS KEEP CALLING HOME TO LEARN HOW THINGS ARE GOING
TOM HIGGINS JR.



Modern Cable Construction



Section VI-B of Mr. Reed's article discusses (a) cable terminal connections, (b) cable terminal mountings for connecting drop wires, and (c) terminals at junctions of cable with open wire.

By JOHN S. REED

Cable Terminal Connections

FACE PLATE and binding post block terminals for pole mounting are provided with two vertical double rows of binding posts. For uniformity and to facilitate identification of cable pairs, the terminal count always begins with the top pair of binding posts in the left hand double row, goes down the row to the bottom posts and then from the top posts in the right double row down to the bottom pair of posts. These bottom posts are generally assigned to the spare or tracer pair of the cable stub, which may be a spare or working pair in the cable count according to company practice.

To maintain the desired uniformity, each right hand post is always connected to the negative (ring or battery) side of the line. Since the red conductor of the cable pair is the negative side, this wire is connected to the right hand post, while the white mate conductor is connected to the left hand post, making it the positive (tip or ground) side of the line. This arrangement is illustrated in *Figure* 123.

This uniformity of polarity greatly facilitates the installation and maintenance of line and station equipment when carried throughout the drop, protector, and station wiring to the telephone instrument.

The cable terminals are designed to mount on poles and building walls with the cable stub entering the terminal through the top. Terminals mounted in this manner will always have the binding posts properly poled. However, when the terminal is reversed in position with the stub entering from the bottom as in the case of an underground cable and riser to terminal mounted on building wall or pole, the polarity of the posts will be reversed unless the cable stub conductors are properly spliced to the main cable conductors.

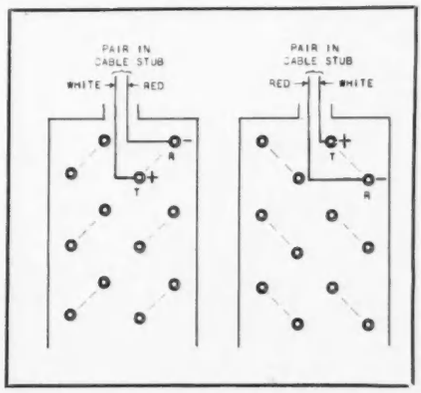


FIG. 123: — Polarity of binding posts in pole mounted cable terminals with different post arrangements.

In such cases, the cable splicer should connect the red conductors of the cable stub to the white conductors of the main cable and the white conductors of the stub to the red conductors of the main cable. This will assure the proper polarity of the binding posts. As a precautionary measure, the splicer should check the polarity of the negative or ring conductor and the associated binding post before starting the splicing operation. He should also take care not

Please Turn To Page 62

to reverse the terminal count of the posts in the inverted terminal.

Typical Cable Terminal Mountings for Connecting Drop Wires

FACE PLATE and binding post type cable terminals are mounted on the pole in a manner similar to the typical example shown in *Figure* 124. The lead straps indicated for attaching the stub to the pole are definitely preferable to ordinary pipe or conduit straps since they will not damage the lead sheath of the stub.

For the drop wire runs, bridle or drive type rings are placed as shown in the illustration, care being taken to provide rings of adequate size for the number of wires entering the terminal. Sizes of bridle rings, which screw into the pole, are usually 1¼″ diameter for 11- or 16-pair terminals and 1⅝″ diameter for 26-pair terminals. Drive rings which can be driven in the pole are ⅞″ and 1¼″ in size. Where the cable terminal is provided with a slip-on cover, care should be taken to locate the upper rings to avoid interfering with raising the cover.

Figure 125 illustrates a typical arrangement of drop wires on jointly-used poles where clearance must be provided on one side or corner of the pole. Drive hooks are placed on the terminal side of the pole to distribute the drop wires from this side as illustrated. Span attachments on the cable messenger are employed to distribute the drops from the other side of the pole (field side) and provide clearance on this side for power linemen to climb past. *Figures* 126 *and* 127 show the arrangements of the drop attachments for situations involving a pole in a straight section of the joint lead and a dead-end pole.

Sufficient slack should be provided in the drop wire runs on the pole so that transfers (or "cuts") of the drops from one side of the terminal to the other can be made when cable pair assignments are changed. This slack is obtained by dropping the wires vertically down past the terminal on one side and looping them up on the other side before entering the terminal. Thus a drop wire intended for binding posts on the left side of the terminal would run down in the ring on the right side of the pole and up through the ring on the left side to enter the terminal. A drop wire to go to the right side of the terminal would run down on the left side of the pole to loop into the terminal on the right side.

Each drop should have about 2 inches slack to enable tracing of any drop in the bundle of wires passing through the rings by moving it back and forth while observing its movement in other parts of the run or feeling for it in the bunch.

Cable Terminals at Junctions of Cable with Open Wire

TELEPHONE cable at junctions with open wire is vulnerable to damage from lightning and power line crosses. The exposed conductors of the open wire lead readily pick up induced charges from nearby lightning strokes, and may be directly in the path of a lightning bolt on occasion. The open wires also cross

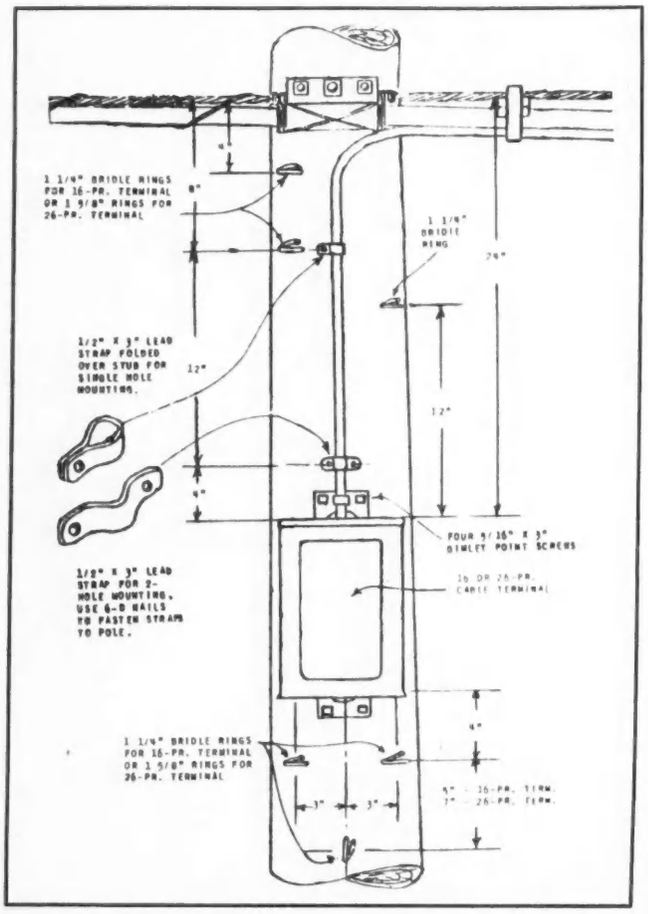

1 1/4" BRIDLE RINGS FOR 16-PR. TERMINAL OR 1 5/8" RINGS FOR 26-PR. TERMINAL
1 1/4" BRIDLE RING
1/2" X 3" LEAD STRAP FOLDED OVER STUB FOR SINGLE HOLE MOUNTING.
1/8" X 3" LEAD STRAP FOR 2-HOLE MOUNTING. USE 6-D NAILS TO FASTEN STRAP TO POLE.
FOUR 5/16" X 3" GIMLET POINT SCREWS
16 OR 26-PR. CABLE TERMINAL
1 1/4" BRIDLE RINGS FOR 16-PR. TERMINAL OR 1 5/8" RINGS FOR 26-PR. TERMINAL

FIG. 124: — Typical arrangement of bridle rings for drop wire runs into cable terminal. Also shown are methods of fastening cable terminal and stub to the pole.

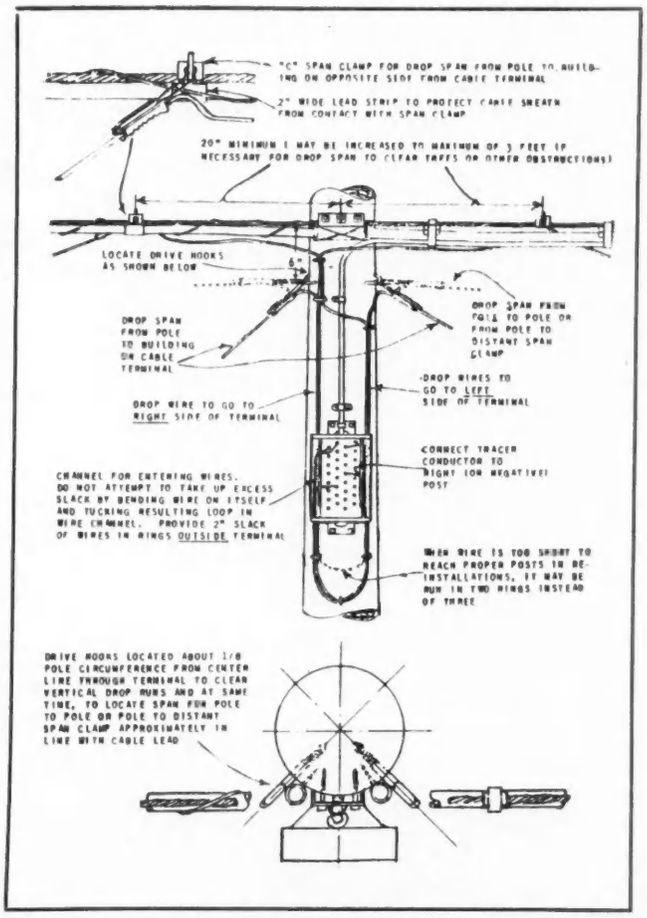

"C" SPAN CLAMP FOR DROP SPAN FROM POLE TO BUILDING ON OPPOSITE SIDE FROM CABLE TERMINAL
2" WIDE LEAD STRIP TO PROTECT CABLE SHEATH FROM CONTACT WITH SPAN CLAMP
20" MINIMUM (MAY BE INCREASED TO MAXIMUM OF 3 FEET IF NECESSARY FOR DROP SPAN TO CLEAR EAVES OR OTHER OBSTRUCTIONS)
LOCATE DRIVE HOOKS AS SHOWN BELOW
DROP SPAN FROM POLE TO BUILDING OR CABLE TERMINAL
DROP SPAN FROM POLE TO POLE OR FROM POLE TO DISTANT SPAN CLAMP
DROP WIRES TO GO TO LEFT SIDE OF TERMINAL
DROP WIRE TO GO TO RIGHT SIDE OF TERMINAL
CONNECT TRACER CONDUCTOR TO RIGHT (OR NEGATIVE) POST
CHANNEL FOR ENTERING WIRES. DO NOT ATTEMPT TO TAKE UP EXCESS SLACK BY BENDING WIRE ON ITSELF AND TUCKING RESULTING LOOP IN WIRE CHANNEL. PROVIDE 2" SLACK OF WIRES IN RINGS OUTSIDE TERMINAL
WHEN WIRE IS TOO SHORT TO REACH PROPER POSTS IN RE-INSTALLATIONS, IT MAY BE RUN IN TWO RINGS INSTEAD OF THREE
DRIVE HOOKS LOCATED ABOUT 1/8 POLE CIRCUMFERENCE FROM CENTER LINE THROUGH TERMINAL TO CLEAR VERTICAL DROP RUNS AND AT SAME TIME, TO LOCATE SPAN FOR POLE TO POLE OR POLE TO DISTANT SPAN CLAMP APPROXIMATELY IN LINE WITH CABLE LEAD

FIG. 125: — Arrangement of drop wires on terminal pole for looping into cable terminal so drops can be transferred from one side of terminal to another in cable pair reassignments.

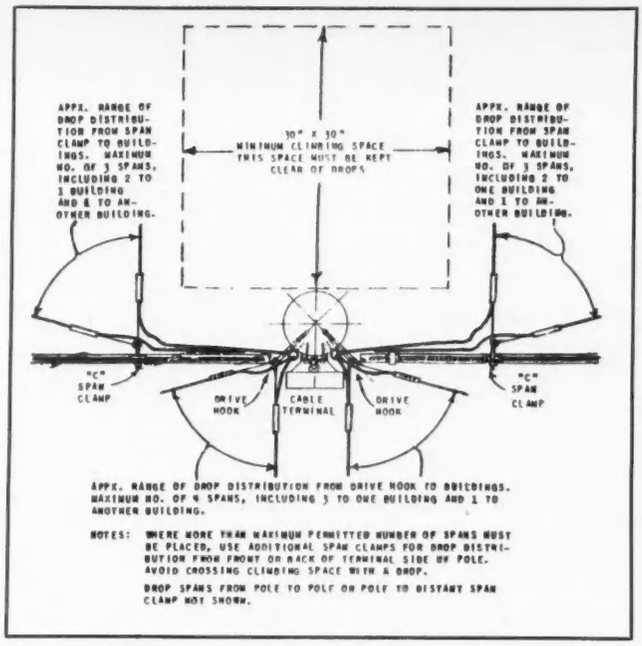

APPX. RANGE OF DROP DISTRIBUTION FROM SPAN CLAMP TO BUILDINGS. MAXIMUM NO. OF 3 SPANS, INCLUDING 2 TO 1 BUILDING AND 1 TO ANOTHER BUILDING.
30" X 30" MINIMUM CLIMBING SPACE THIS SPACE MUST BE KEPT CLEAR OF DROPS
APPX. RANGE OF DROP DISTRIBUTION FROM SPAN CLAMP TO BUILDINGS. MAXIMUM NO. OF 3 SPANS, INCLUDING 2 TO ONE BUILDING AND 1 TO ANOTHER BUILDING.
"C" SPAN CLAMP
DRIVE HOOK
CABLE TERMINAL
DRIVE HOOK
"C" SPAN CLAMP
APPX. RANGE OF DROP DISTRIBUTION FROM DRIVE HOOK TO BUILDINGS. MAXIMUM NO. OF 4 SPANS, INCLUDING 3 TO ONE BUILDING AND 1 TO ANOTHER BUILDING.
NOTES: WHERE MORE THAN MAXIMUM PERMITTED NUMBER OF SPANS MUST BE PLACED, USE ADDITIONAL SPAN CLAMPS FOR DROP DISTRIBUTION FROM FRONT OR BACK OF TERMINAL SIDE OF POLE. AVOID CROSSING CLIMBING SPACE WITH A DROP.
DROP SPANS FROM POLE TO POLE OR POLE TO DISTANT SPAN CLAMP NOT SHOWN.

FIG. 126: — Arrangement of drops to obtain adequate climbing space on jointly used pole in straight sections of lead.

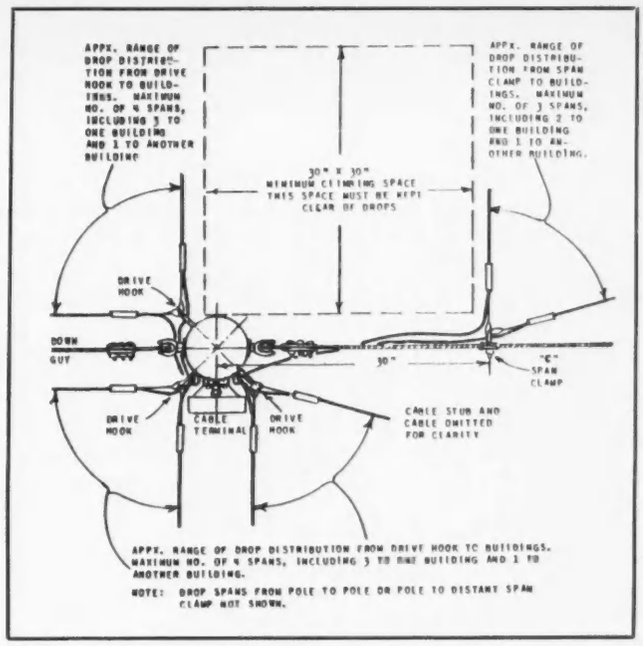

APPX. RANGE OF DROP DISTRIBUTION FROM DRIVE HOOK TO BUILDINGS. MAXIMUM NO. OF 4 SPANS, INCLUDING 3 TO ONE BUILDING AND 1 TO ANOTHER BUILDING.
APPX. RANGE OF DROP DISTRIBUTION FROM SPAN CLAMP TO BUILDINGS. MAXIMUM NO. OF 3 SPANS, INCLUDING 2 TO ONE BUILDING AND 1 TO ANOTHER BUILDING.
30" X 30" MINIMUM CLIMBING SPACE THIS SPACE MUST BE KEPT CLEAR OF DROPS
DRIVE HOOK
DOWN GUY
30"
"C" SPAN CLAMP
DRIVE HOOK
CABLE TERMINAL
DRIVE HOOK
CABLE STUB AND CABLE OMITTED FOR CLARITY
APPX. RANGE OF DROP DISTRIBUTION FROM DRIVE HOOK TO BUILDINGS. MAXIMUM NO. OF 4 SPANS, INCLUDING 3 TO ONE BUILDING AND 1 TO ANOTHER BUILDING.
NOTE: DROP SPANS FROM POLE TO POLE OR POLE TO DISTANT SPAN CLAMP NOT SHOWN.

FIG. 127: — Arrangement of drops for adequate climbing space on dead ended jointly used pole.

under power lines at a number of points or may be carried on the same poles with power wires and is thus exposed to the hazard of high voltage contacts.

The use of protective devices coupled with proper bonding and grounding procedures will greatly reduce the chance of damage to the cable. Mention has already been made of the use of ten-wire arresters in conjunction with an unprotected type terminal, and of a protected type terminal with fuses at the junction.

Bonding of the cable sheath to the protector ground post is a very important factor in preventing break down of the cable conductor insulation in the terminal stub. This bond equalizes the potential on the sheath and conductors resulting from the lightning charge or power cross and no break down results. The highest potential that could result at this point would be the maximum breakdown voltage across the protector blocks in the arrester or protected terminal.

Figure 128 illustrates typical schematics of the bonding and protective arrangement for an unprotected type terminal with arrester and for a protected type terminal. This schematic shows the use of an earth connection in addition to the bond. Many companies do not think this ground connection is essential and usually omit it. However, it should be considered to be a precautionary measure to be employed when experience indicates its use to be desirable. This earth connection should have as low a resistance as possible, approximating that obtained by bonding the arrester ground post directly to the cable sheath.

Within recent years, it has been found that connecting the cable sheath to a grounding conductor of a multigrounded neutral power system, as near as possible to the cable junction with open wire, produces the most effective ground from the protection standpoint. This connection is made to the nearest available grounding conductor either in joint construction or at a crossing of the power distribution lead and the cable lead. If a grounding conductor is not avail-

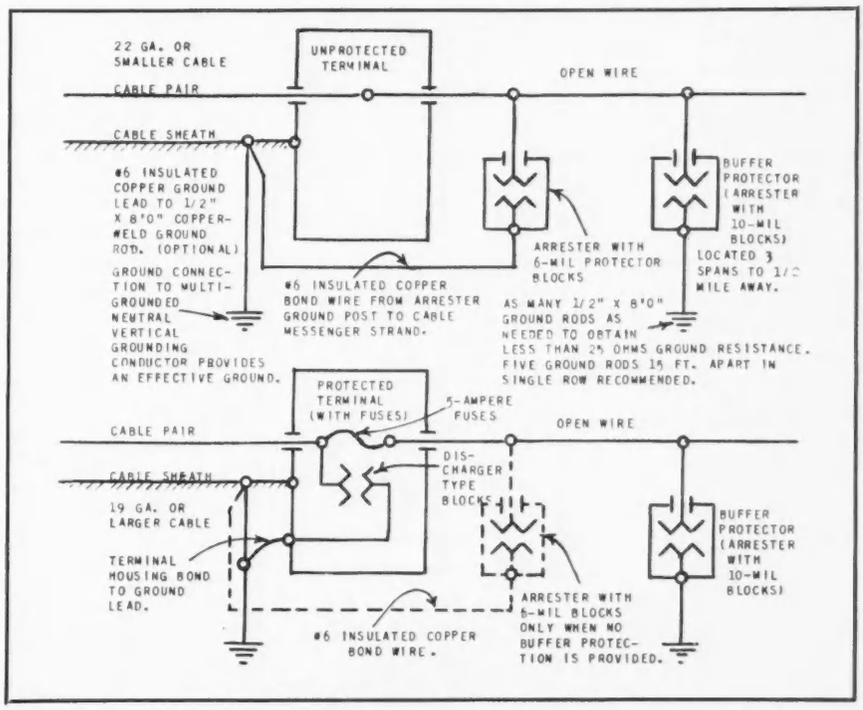

22 GA. OR SMALLER CABLE
CABLE PAIR
CABLE SHEATH
UNPROTECTED TERMINAL
OPEN WIRE
#6 INSULATED COPPER GROUND LEAD TO 1/2" X 8'0" COPPER-WELD GROUND ROD. (OPTIONAL)
GROUND CONNECTION TO MULTI-GROUNDED NEUTRAL VERTICAL GROUNDING CONDUCTOR PROVIDES AN EFFECTIVE GROUND.
#6 INSULATED COPPER BOND WIRE FROM ARRESTER GROUND POST TO CABLE MESSENGER STRAND.
ARRESTER WITH 6-MIL PROTECTOR BLOCKS
BUFFER PROTECTOR (ARRESTER WITH 10-MIL BLOCKS) LOCATED 3 SPANS TO 1/2 MILE AWAY.
AS MANY 1/2" X 8'0" GROUND RODS AS NEEDED TO OBTAIN LESS THAN 25 OHMS GROUND RESISTANCE. FIVE GROUND RODS 15 FT. APART IN SINGLE ROW RECOMMENDED.
PROTECTED TERMINAL (WITH FUSES)
5-AMPERE FUSES
CABLE PAIR
OPEN WIRE
CABLE SHEATH
DIS-CHARGER TYPE BLOCKS
19 GA. OR LARGER CABLE
TERMINAL HOUSING BOND TO GROUND LEAD.
BUFFER PROTECTOR (ARRESTER WITH 10-MIL BLOCKS)
ARRESTER WITH 6-MIL BLOCKS ONLY WHEN NO BUFFER PROTECTION IS PROVIDED.
#6 INSULATED COPPER BOND WIRE.

FIG. 128: — Typical cable protection schematics. Above — for unprotected type terminal with arrester on 22 gauge or smaller cable where a section of 24 gauge (or finer gauge) cable is provided between the junction and the office. Below — for protected type cable terminal equipped with fuses and protector blocks on 19 gauge or larger cable with no section of fine gauge cable.

able on the pole at the crossing, one can be installed by the telephone company with connection to the power neutral made by a power lineman. It is desirable that the cable be attached to the same pole as the power wires at the crossing point to obtain the desired bond to the neutral.

The protection methods just described apply to protection of working cable pairs only. Many companies have been following the practice of providing full-count protection; that is, every working and vacant pair in the cable is protected at the cable end. This procedure is intended to equalize foreign potentials between every conductor and the cable sheath. In this case, fully-equipped protected type terminals are employed at cable junctions with open wire. The protected type terminal with fuseless protector units illustrated in *Figure* 120 lends itself well to full-count protection. Experience will generally determine whether or not full-count protection should be applied at end cable terminals.

Where the cable lead has a number of terminals preceding the end terminal, and trouble has been experienced with breakdown of the cable pairs near these terminals, auxiliary protection at several of the terminals next to the end terminal will solve this problem. In this case, 10-wire arresters, or if only a single drop feeds from the terminal, outside type protectors less fuses (or fuseless type protectors) with 6-mil protector blocks, may be employed. The full-count protection may be maintained at the end terminal, or protection may be omitted on the pairs which connect to the drops at the other terminals protected in the manner just described. The latter method, however, may be difficult to control, since it could not be easily determined if all cable pairs are receiving the required protection.

Figures 129 *and* 130 illustrate the methods of placing terminals, bridle rings, and jumper wires on the junction pole for the two different methods of protecting the cable shown in *Figure* 128. It will be noted that No. 14 insulated jumpers are recommended for the connection between the open wires and the arrester or protected terminal. Their use is considered desirable where trouble has been experienced with frequent lightning No. 20 gauge bridle wires. These heavier gauge insulated wires will also maintain a high current flow in case of a high voltage power line cross with the open wires and thus promote rapid de-energization of the power line involved in the cross. Where high grade toll circuits are involved, No. 14 insulated wires must be used throughout the run from the open wire connection to the binding posts of the cable terminal to maintain service on these circuits under all conditions.

Stepping of Pole-Mounted Cable Terminal Poles

TO FACILITATE access to cable terminals for connecting, removing or transferring drop wires, the terminal poles are equipped with pole steps. This procedure also prevents damage to these poles from frequent jabbing with climber gaffs.

Terminal poles should be stepped in accordance with a standard procedure that assures uniformity of

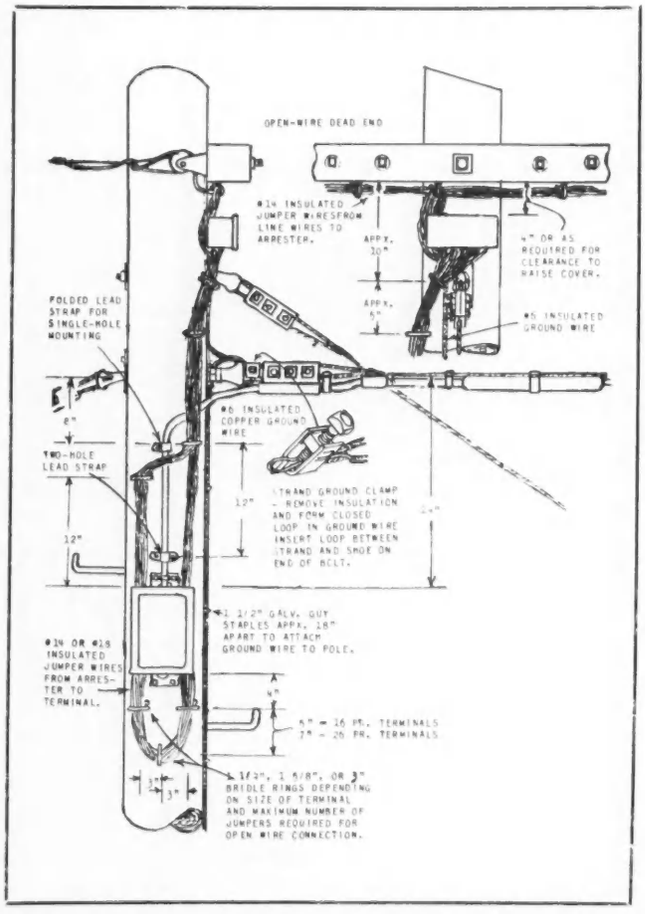

OPEN-WIRE DEAD END
#14 INSULATED JUMPER WIRES FROM LINE WIRES TO ARRESTER.
APPX. 30"
4" OR AS REQUIRED FOR CLEARANCE TO RAISE COVER.
APPX. 5"
#6 INSULATED GROUND WIRE
FOLDED LEAD STRAP FOR SINGLE-HOLE MOUNTING
#6 INSULATED COPPER GROUND WIRE
TWO-HOLE LEAD STRAP
12"
STRAND GROUND CLAMP — REMOVE INSULATION AND FORM CLOSED LOOP IN GROUND WIRE INSERT LOOP BETWEEN STRAND AND SHOE ON END OF BOLT.
1 1/2" GALV. GUY STAPLES APPX. 18" APART TO ATTACH GROUND WIRE TO POLE.
#14 OR #19 INSULATED JUMPER WIRES FROM ARRESTER TO TERMINAL.
4"
5" — 16 PR. TERMINALS
7" — 26 PR. TERMINALS
1 1/2", 1 5/8", OR 3" BRIDLE RINGS DEPENDING ON SIZE OF TERMINAL AND MAXIMUM NUMBER OF JUMPERS REQUIRED FOR OPEN WIRE CONNECTION.

FIG. 129: — Typical arrangement of arrester, jumper, and ground wires at junction of cable with open wire where unprotected type terminal is employed.

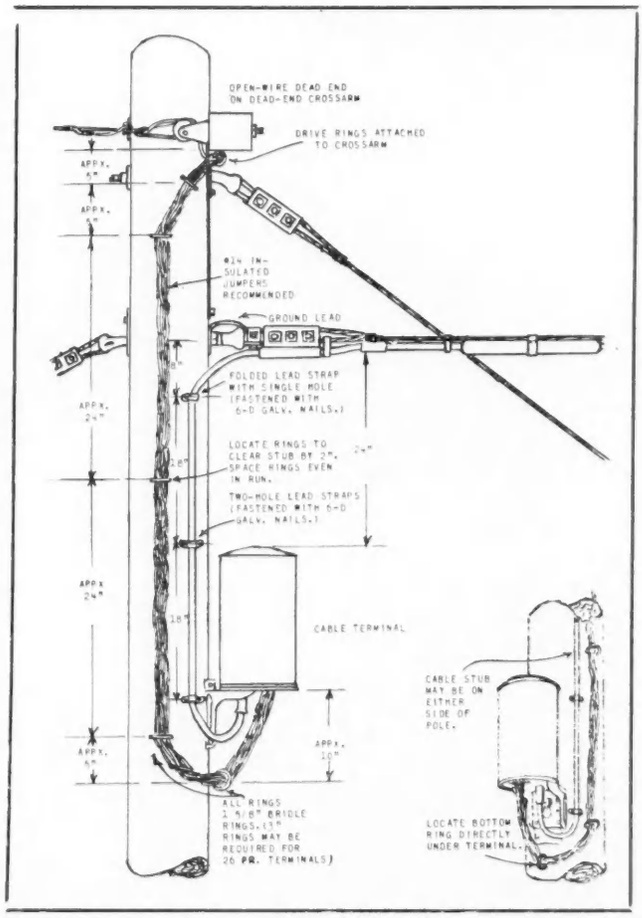

OPEN-WIRE DEAD END ON DEAD-END CROSSARM
DRIVE RINGS ATTACHED TO CROSSARM
APPX. 6"
APPX. 6"
#14 INSULATED JUMPERS RECOMMENDED
GROUND LEAD
FOLDED LEAD STRAP WITH SINGLE HOLE (FASTENED WITH 6-D GALV. NAILS.)
APPX. 24"
LOCATE RINGS TO CLEAR STUB BY 2". SPACE RINGS EVEN IN RUN.
18"
24"
TWO-HOLE LEAD STRAPS (FASTENED WITH 6-D GALV. NAILS.)
APPX. 24"
18"
CABLE TERMINAL
CABLE STUB MAY BE ON EITHER SIDE OF POLE.
APPX. 10"
APPX. 6"
ALL RINGS 1 5/8" BRIDLE RINGS. (1" RINGS MAY BE REQUIRED FOR 26 PR. TERMINALS)
LOCATE BOTTOM RING DIRECTLY UNDER TERMINAL.

FIG. 130: — Typical arrangement of jumper wires at junction of cable with open wire where protected type terminal with fuses is employed.

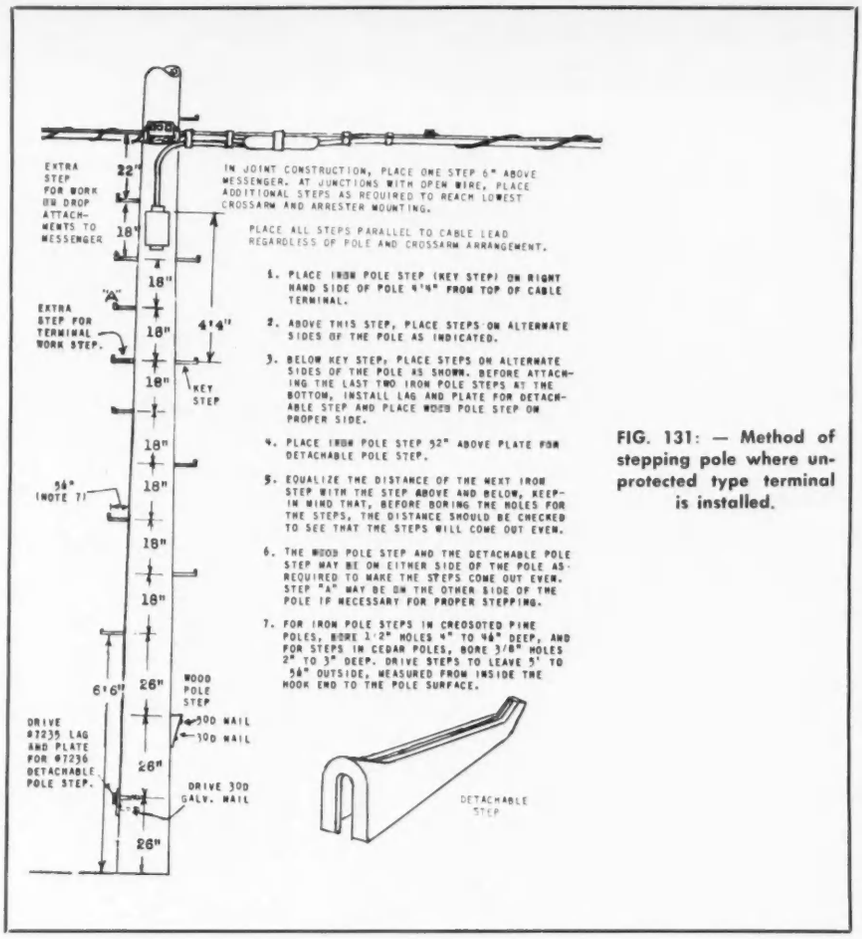

EXTRA STEP FOR WORK ON DROP ATTACHMENTS TO MESSENGER
22"
18"
IN JOINT CONSTRUCTION, PLACE ONE STEP 6" ABOVE MESSENGER. AT JUNCTIONS WITH OPEN WIRE, PLACE ADDITIONAL STEPS AS REQUIRED TO REACH LOWEST CROSSARM AND ARRESTER MOUNTING.
PLACE ALL STEPS PARALLEL TO CABLE LEAD REGARDLESS OF POLE AND CROSSARM ARRANGEMENT.
1. PLACE IRON POLE STEP (KEY STEP) ON RIGHT HAND SIDE OF POLE 6'6" FROM TOP OF CABLE TERMINAL.
2. ABOVE THIS STEP, PLACE STEPS ON ALTERNATE SIDES OF THE POLE AS INDICATED.
3. BELOW KEY STEP, PLACE STEPS ON ALTERNATE SIDES OF THE POLE AS SHOWN. BEFORE ATTACHING THE LAST TWO IRON POLE STEPS AT THE BOTTOM, INSTALL LAG AND PLATE FOR DETACHABLE STEP AND PLACE WOOD POLE STEP ON PROPER SIDE.
4. PLACE IRON POLE STEP 52" ABOVE PLATE FOR DETACHABLE POLE STEP.
5. EQUALIZE THE DISTANCE OF THE NEXT IRON STEP WITH THE STEP ABOVE AND BELOW, KEEPING IN MIND THAT, BEFORE BORING THE HOLES FOR THE STEPS, THE DISTANCE SHOULD BE CHECKED TO SEE THAT THE STEPS WILL COME OUT EVEN.
6. THE WOOD POLE STEP AND THE DETACHABLE POLE STEP MAY BE ON EITHER SIDE OF THE POLE AS REQUIRED TO MAKE THE STEPS COME OUT EVEN. STEP "A" MAY BE ON THE OTHER SIDE OF THE POLE IF NECESSARY FOR PROPER STEPPING.
7. FOR IRON POLE STEPS IN CREOSOTED PINE POLES, BORE 1 1/2" HOLES 4" TO 4 1/2" DEEP, AND FOR STEPS IN CEDAR POLES, BORE 3/8" HOLES 2" TO 3" DEEP. DRIVE STEPS TO LEAVE 5" TO 5 1/2" OUTSIDE, MEASURED FROM INSIDE THE HOOK END TO THE POLE SURFACE.
"A"
EXTRA STEP FOR TERMINAL WORK STEP.
4'4"
KEY STEP
54" (NOTE 7)
6'6"
WOOD POLE STEP
30D NAIL
30D NAIL
DRIVE #7235 LAG AND PLATE FOR #7236 DETACHABLE POLE STEP.
DRIVE 30D GALV. NAIL
DETACHABLE STEP

FIG. 131: — Method of stepping pole where unprotected type terminal is installed.

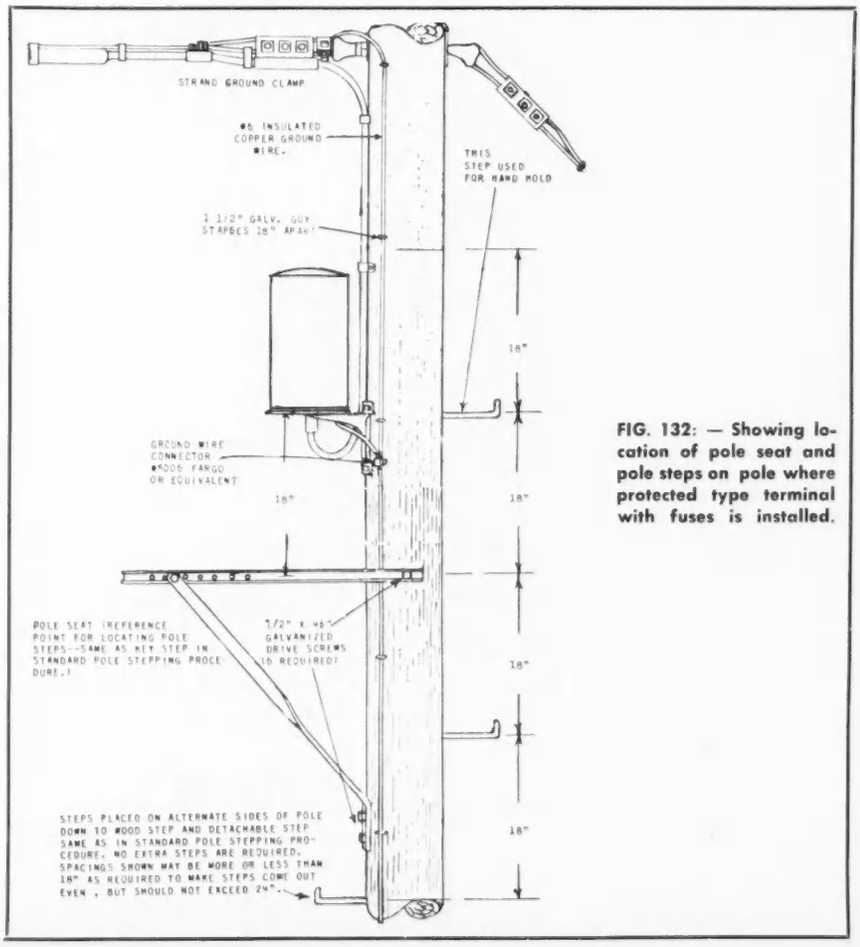

STRAND GROUND CLAMP
#6 INSULATED COPPER GROUND WIRE.
THIS STEP USED FOR HAND HOLD
2 1/2" GALV. GUY STAPLES 18" APART
18"
GROUND WIRE CONNECTOR #6005 FARGO OR EQUIVALENT
POLE SEAT (REFERENCE POINT FOR LOCATING POLE STEPS—SAME AS KEY STEP IN STANDARD POLE STEPPING PROCEDURE.)
1/2" X 4" GALVANIZED DRIVE SCREWS (6 REQUIRED)
STEPS PLACED ON ALTERNATE SIDES OF POLE DOWN TO WOOD STEP AND DETACHABLE STEP SAME AS IN STANDARD POLE STEPPING PROCEDURE. NO EXTRA STEPS ARE REQUIRED. SPACINGS SHOWN MAY BE MORE OR LESS THAN 18" AS REQUIRED TO MAKE STEPS COME OUT EVEN, BUT SHOULD NOT EXCEED 24".

FIG. 132: — Showing location of pole seat and pole steps on pole where protected type terminal with fuses is installed.

stepping and a safe working position for the combinationmen on the pole. Such a working position should place the man at about chest level with the terminal, keeping his face and eyes above the binding posts. This minimizes injury to the face or eyes in case pliers or other working tool slips in the wiring procedure. Locating the "key" steps 52 inches down from the top of the terminal will provide the proper working position for the average height of workmen and practically all types of face-plate and binding post block cable terminals.

The recommended stepping procedure is illustrated in *Figure* 131. It will be noted that a detachable type step is provided at the first step and a wood butt block at the second step. The third and following steps are standard iron pole steps. This third step is located 6½ feet from the ground in conformity with the National Electrical Safety Code. The first step is removable and is carried in the company truck, leaving only a plate and head of a special lag screw that cannot be clambered up on by children.

The wood butt block, used for the second step, is sufficiently high up on the pole to meet the N.E.S.C. requirement for a minimum height of 3½ feet above the ground. This step, however, presents a rather small supporting surface for the climber's foot. For this reason, many companies make use of a second detachable step in place of this wood block. This requires carrying two detachable steps in the company truck, but has the added advantage of making unauthorized climbing of terminal poles even more difficult.

Junction poles are stepped in the same manner as for regular terminal poles where a face-plate type cable terminal is installed on these poles. Where a protected type of cable terminal with fuses is involved, it is desirable to place a pole seat to facilitate work on the terminal. The mounting procedure is shown in *Figure* 132, which also illustrates the method of placing the ground lead and rod for the terminal.—*To Be Continued.*

Judgment

A business man's judgment is no better than his information.—R. P. LAMONT.

Handling The Problem Employe

By ERNEST W. FAIR

PROBLEM employes will always be with us. Every good telephone company staff has one or more such employes on the staff. If he or she is not there today we can be sure that sooner or later they will be.

One method of handling such problem employes is to simply dismiss the individual then and there. This easy method, however, accomplishes little for we will be faced with the same problem again and again on re-hiring and the chances are probably very good one of them will otherwise be the very best employe the executive has ever had on his staff.

In many instances such problem employes are easy to handle. In nine out of ten cases the problems can be handled without too much difficulty. The application of a few time tested and proven methods of handling such problems will take care of all but the most stubborn cases. With the few such individuals we will encounter the aforementioned method of dismissing from the staff is probably the best method of handling the situation. With all others, however, there are very easy steps we can take to remove these problems and increase the value of each such employe to the company staff.

Many experience surveys have been made on this subject. We have analyzed and condensed more than a dozen of these to compile the following handy guide for the executive to use in handling these problem employes on his own staff:

Playfulness On the Job is an annoying problem almost every executive must face at one time or another. Such apparently harmless activity can often prove costly not only from the standpoint of wasted time but possibility of accident as well.

Such individuals practice their art primarily from a desire to be important among their fellow workers whether they be employed out in the field or in a fixed installation. Lax discipline and not sufficient work have also been noted as causes of this condition.

Methods of handling this type of problem employe are to of course attempt to find the direct cause of each individual case. In most instances assignment of more work to reduce opportunities for play will be the best solution. In others such things as providing a method of recognition for the individual at his job. Other tested solutions include careful explanation to the individual of the safety hazards involved in such actions, inducing the remainder of the staff to assist in removal of the problem for their own good, checking the tasks assigned the individual to better place that person on the staff and allowing more "break" time during each work day.

Insubordination is definitely one problem we cannot "put up with" at any time for permitting its continuation will result in break down of the full staff in a short period of time.

Experts tell us that chief causes of insubordination by employes are lack of interest in his or her job, spite, jealousy, favoritism and personal issues involved between the individual and the executive.

"The bigger a man's head gets, the easier it is to fill his shoes."

Any such case should be investigated very thoroughly before an action is taken for this is one where the exact cause must be known for proper treatment. In some instances transfer of the individual to other departments or other jobs will do much toward handling the problem. Where a personal issue is involved we should use every means possible toward settling that problem if it can be done. Efforts made toward building up interest in the individual's job have often proved ideal in handling such a situation.

"Soldiering" is another problem many executives must face. It is usually caused by improper work schedules which encourage such actions by any individual so inclined. Lax discipline, lack of interest and fears of continued security in the job are other contributing factors.

Readjustment of work schedules is the method most often used to solve this problem, i.e., giving the individual less and less opportunity to practice this trait, more firmness in exercising authority over the individual by the executive himself or the individual's direct supervisor and a carefully planned effort to show the importance of a good job to that individual are methods that have been used to handle this problem.

Rumor Spreaders can produce constant troubles of all sorts in any telephone company organization, large or small, and for some unexplained reason we have them always with us. Jealousy, curiosity, desire to seem important and plain maliciousness have been tabulated by psyhcologists as reasons for this problem employes activities.

Usually many such individuals

This new carrier has all "45-family" features

Newest addition to Lenkurt's famous 45-class "family" of carrier systems is Type 45CB, an economical system for use on open wire. If you need as few as four channels or less on "light" routes, this system offers many advantages previously available only in carrier for large circuit groups.

Like every Lenkurt 45-class carrier system, Type 45CB gives you direct interconnection *at carrier frequencies* with all other 45-class systems for open-wire, cable or radio. You save by making full use of existing facilities, and by eliminating channel units at connecting points. Here is just one of the many ways Type 45CB permits major savings.

If you want a few more toll-quality circuits for short- and medium-haul applications, investigate the savings offered by Lenkurt Type 45CB. Write today for complete information. Address: Automatic Electric Sales Corporation, 1033 W. Van Buren St. (HAymarket 1-4300), Chicago 7, Illinois. In Canada: Automatic Electric Sales (Canada) Ltd., Toronto. *Offices in principal cities.*

TYPE 45CB FEATURES

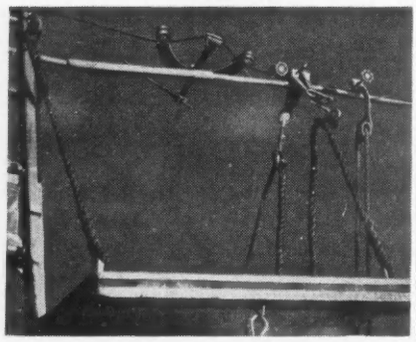
- Transistorized components lower power consumption, reduce heat dissipation problems
- Miniaturized construction: 4 channels, only 15¾" high on 19" rack
- Coordinates with W. E. Type OB carrier
- Add up to four channels on each pair already using Type 33A or equivalent
- Compandors reduce noise and crosstalk, permitting operation on low-frequency transposed open-wire circuits
- Direct interconnection at carrier frequencies

AUTOMATIC ELECTRIC®

ORIGINATORS OF THE DIAL TELEPHONE

Sorry

WE CAN'T FURNISH THE SPLICER—BUT WE CAN FURNISH MOST OF HIS TOOLS



- LGI SLACK PULLER (slip handle)
- LG12 SLACK PULLER (Ratchet Handle)
- PC2 PLATFORM CLAMPS
- HB3 HANDLINE BLOCK
- LC5 LASHING WIRE CLAMP
- CK6 CHIPPING KNIFE CASE
- DPV15 DROP PROOF VALVE CAPS
- SC&B17 SOAP CONTAINER
- SPH18 SINGLE EYE PLATFORM HOOK
- DPH19 DOUBLE EYE PLATFORM HOOK
- RTS20 PRESSURE TESTING SOAP
- CSP21 SPLICER'S PLATFORM
- STB22 SPLICERS TOOL BOX
- CL29 POWER STRAP
- TA32 TENT ADAPTER
- ST34 SPLICER'S TONE

Write for Prices and Literature

CABLE SPINNING EQUIPMENT CO.

3100 TOPEKA AVE.

TOPEKA KANSAS

Phone 2-7234

OVERSEAS SALES:

Ericsson Telephone Sales Corp. of New York

Automatic Electric of Canada

Pirelli of Great Britain

have no idea of the harm they do in pursuit of this practice and need only to be told the results of their actions; if possible, cited specific examples of the harm that can be done by spreading rumors about the company, its personnel or its services.

Constant Complainers spread discontent among other workers and create constant havoc in any staff. Such individuals upset all other employe's good intentions; make it difficult for them to do the job they want to do.

Work conditions, poor wages, lack of recognition and poor leadership have been found to be causes of this course of action by experts. They have also found that certain individuals have this trait so well developed it has become second nature with them and that the only way they can be handled is to isolate them so that the effect of their actions will be minimized.

Such transfer of the individual usually eases the situation. An investigation of possible wage insecurity involved or to see if good efforts put forth in the past have received proper recognition may reveal causes in any particular individual's case that can be handled without difficulty by the telephone company executive.

Disloyalty is a condition that cannot be tolerated in our company. This problem employe can cause irreparable damage to the reputation of even the smallest telephone company. There are some individuals who, by their very natures, can never be loyal to anyone or anything. No matter what merits such an individual may possess his disloyalty outweighs them all.

But there are also many individuals who have come into the disloyal attitude through discontent, favoritism or lack of recognition, whose problem can be handled and their good talents put to full value by the executive.

The first step should be determination of whether or not the individual belongs in the former or latter group. If in the former he or she should be fired. If in the latter his or her problem may be solved through investigation of the cause, giving that individual fair play to which he or she is entitled and in some cases setting up a merit rating system for the staff.

Poor Quality Of Work is another problem we often find with one or more employes and which deserves all of the attention we can give it. The cause can usually be found in lack of knowledge of the requirements of the work, just plain laziness as second nature for the individual or a desire to be outstanding to the extent that the individual loses the touch of quality in his or her work in the effort to obtain volume.

Each of these particular causes suggests the obvious remedy. Showing the individual the importance of the job, proper instruction in how to handle his or her particular chore and establishing a penalty for poor work as well as a reward for good work have been methods used in handling this particular type of problem employe.

Employes Addicted to Absenteeism can be handled by personal talks, creation of greater interest in the job and emphasizing the importance of being on the job toward keeping that job. The individual who is constantly complaining about working conditions can have his trouble coming from the actual experience of such poor working conditions, jealousy or a feeling of favoritism, all of which can be handled without trouble by the executive.

The problem employe addicted to excessive talking can be cured by recommendation of more social contacts and help in finding them, reassigning to a job which requires greater concentration on the individual's part and a little honest explanation of the effect such constant talking has on fellow workers.

The problem employe guilty of Theft can be handled by eliminating the opportunities for such theft, a visit to a psychiatrist, checking his or her home or money needs and trying to work out their problems and a sterner policy in exacting punishment for such practices.—***Ernest W. Fair***

"No family should have less than three children, so there will be two to support the genius!"

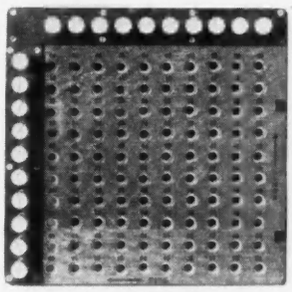
OVER 3000 NOW IN USE IN UNITED STATES, CANADA & HAWAII

THE Murphy (ONE MAN) CABLE TESTER

NOW, for the first time ONE MAN can test to identify cable pairs and do it three times as fast as two men could formerly do the job. "ONE-MAN" splicing crews are now a reality. On new cable work, labor costs are reduced by from 30% to 50%, depending on just how far you are prepared to go in utilizing the One-Man crew.

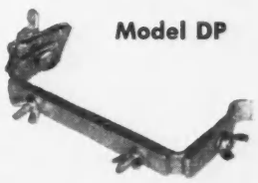
Model CMU Meter Unit

The still further improved Model C Meter Unit, Model CMU. Three Test Sets in one — THE MURPHY ONE MAN CABLE IDENTIFIER, The Buzzer Continuity Tester — and the Ohmmeter for locating trouble.



Model TTB, Combination Tag and Terminating Board

This is the new board that automatically sorts and groups the wires just the way you need them for connecting to the binding posts of the terminal board — only, in this case, the Terminal Board is built right into the Tag Board.



Model DP

Dual Purpose Clamp

This dual purpose clamp will hold the Terminating Board or the Meter Unit at any angle, above or below the strand, for convenience during use.

Durable Steel Cases For All Units . . . . . *Write for prices, terms, etc.*

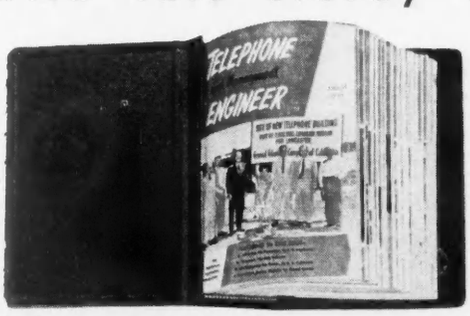
MURPHY ENGINEERING LABORATORIES, INC.

4419 TULSA, HOUSTON 24, TEXAS PHONE: OVerland 2-4000

Now you can preserve and protect your

TELEPHONE ENGINEER MAGAZINES

with this sturdy full-sized BINDER



$4

EACH

POSTPAID

Bind your copies for QUICK reference in this handsome, durable binder. Magazines easily inserted or removed. No punching necessary. Strong covers and backbone bound in beautiful imitation leather. Attractive in any library.

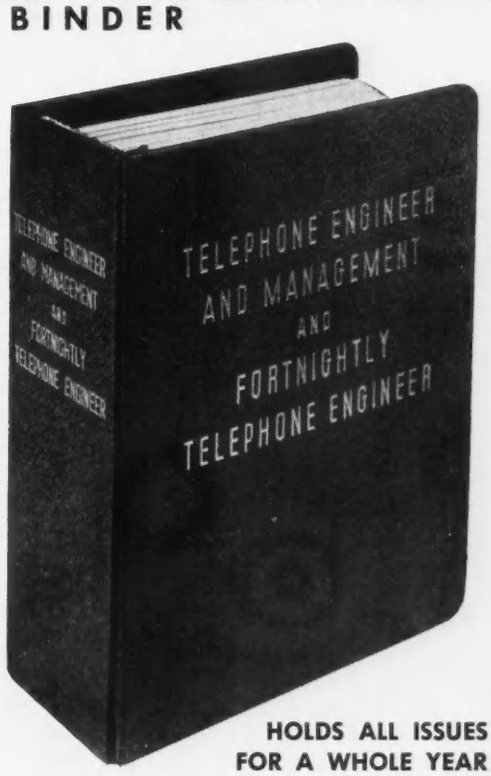
TELEPHONE ENGINEER Pub. Corp.
7720 Sheridan Road,
Chicago 26, Illinois , 1956

Gentlemen: I am enclosing $ covering binders @ $4.00 each postpaid.

Name

Company

Address


TELEPHONE ENGINEER AND MANAGEMENT AND FORTNIGHTLY TELEPHONE ENGINEER
TELEPHONE ENGINEER AND MANAGEMENT AND FORTNIGHTLY TELEPHONE ENGINEER

HOLDS ALL ISSUES FOR A WHOLE YEAR

North Carolina Independents Hold Annual Convention

■ PINEHURST, N. C. — The Carolina hotel at Pinehurst was the scene of the 24th annual convention of the North Carolina Independent Telephone Association on October 17 and 18. An estimated 250 association members and their guests were on hand to hear prominent speakers and participate in the various entertainment activities of the Convention.

At the directors meeting held on the opening day of the convention L. S. Blades of the Norfolk and Carolina Telephone Co. was elected president of the Association for the coming year. Other officers elected were: W. A. Carpenter of the Hickory Telephone Co., 1st vice president; Frank LaPrade of the Lee Telephone Co., 2nd vice president; John Cline of the United Telephone Co. of the Carolinas, 3rd vice president; and P. J. Long of the Carolina Telephone & Telegraph Co., secretary-treasurer.

Speakers included men from various phases of business. Certified Public Accountant, James B. Lyford, and Professor of Accounting at Duke University, Martin L. Blake discussed accounting as related to financing and the duties of a Certified Public Accountant in auditing public utilities books and interpreting the results to stockholders and the public.

Frank Newton, assistant vice president of Southern Bell Telephone & Telegraph Co., spoke on "Telephone Merchandising" while Jack Riley, publicity director of Carolina Power & Light Co., spoke on "Public Relations in Public Utilities."

The Dean of the College of Engineering at Duke University, Walter J. Seely, reminded the convention of the many opportunities for young engineers in the telephone industry and pointed out means in which the industry can attract these young men. Leon F. Roberts, director of information of United States Independent Telephone Association, spoke on "What our Telephone Association Means."

Entertainment and dancing were featured program events during both evenings of the Convention.

Elected to serve as North Carolina Independent Telephone Association Directors for the coming year are: W. S. Beddingfield, Mt. Airy; L. S. Blades, Elizabeth City; W. A. Carpenter, Hickory; John Cline, Southern Pines; L. D. Coltrane, Jr., Concord; E. O. Freeman, Aberdeen; W. C. Harris, Lexington; L. W. Hill, Tarboro; Frank LaPrade, Martinsville; R E. McKelvey, Franklin; Mrs. J. D. Morris, Roxboro; L. D. Garibaldi, Matthews; J. H. Sinder, Denton; Robbins Tilden, High Point; and Ralph Van Trine, Durham.

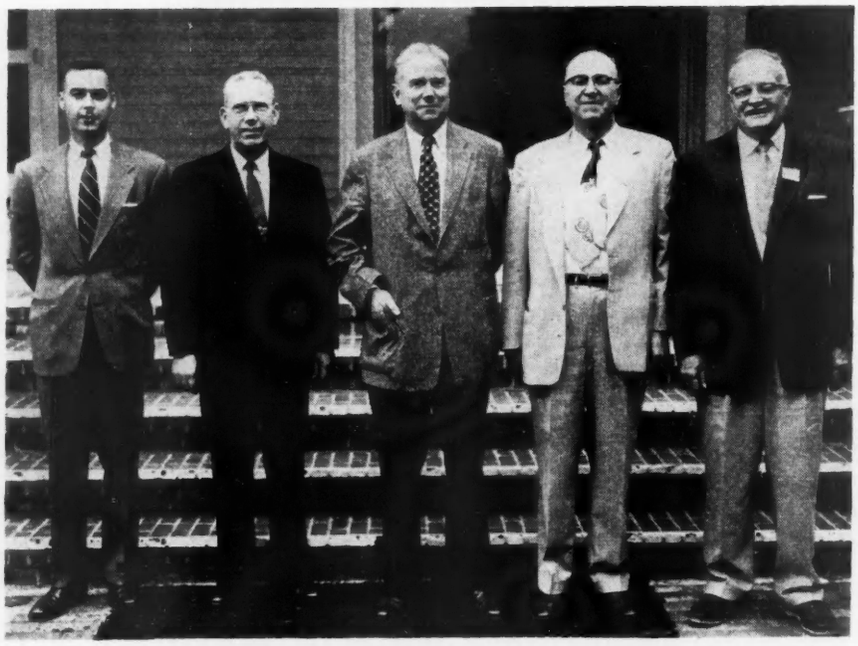
John Birchmore Heads Georgia Association

■ SAVANNAH, GA. — About 200 representatives of the 91 telephone companies serving Georgia met at the Hotel DeSoto, Savannah, Ga., for the annual meeting of the Georgia Telephone Association.

John Birchmore, president of the Comer-Danielsville Telephone Co., was re-elected president of the association. J. P. Gleaton of Tifton was elected first vice president; Nelson Mahone of Fitzgerald, second vice president; and S. B. Green of Ellijay was re-elected secretary-treasurer.

New directors elected for three-year

North Carolina Officers



(L. to r.) — H. J. Long, secretary; F. J. LaPrade, 1st vice-president; L. S. Blades, Jr., president; W. A. Carpenter, 2nd vice-president; John Cline, 3rd vice-president.

terms are C. B. Lanier, Jr., West Point; Downing Musgrove, Homerville; W. K. Mosley, Atlanta; J. M. Evitt, Ringgold; and E. H. Hurst, Cairo.

Speakers were Leon F. Roberts, director of information for the United States Independent Telephone Association; Everett C. Weitzell, head of the telephone operations and loans division of the REA; and B. N. Darlington, general plant manager for the Peninsular Telephone Co., Tampa, Fla.

The program began informally with registration and a bingo party. The following morning was devoted to a business session and the afternoon to the three addresses. In the evening a hospitality hour sponsored by associate members preceded the annual banquet. The meeting closed following a breakfast and annual meeting of the board of directors on the morning of the 19th.

In discussing the value of associations to the telephone industry Mr. Roberts praised the cooperative advertising program sponsored by the USITA. He said, "Advertising is the cheapest form of business communications ever devised." He pointed out that in just one year the USITA program had done much good, had raised the prestige of the industry generally and in particular with the financial world, where independents must often go for expansion financing.

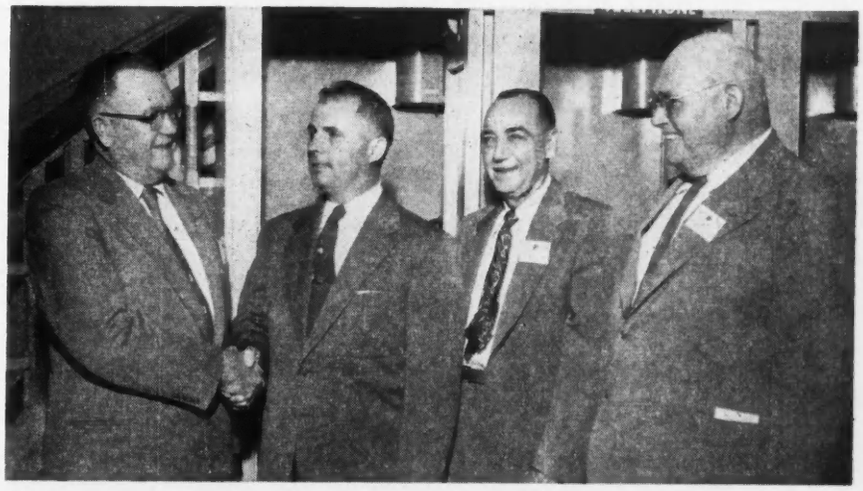
E. C. Weitzell of the REA said that the REA telephone loan program had worked wonders in revitalizing many small independent companies formerly in difficulty because of inability to finance expansion programs. He stated that 393 borrowers in 42 states had REA loans outstanding in the amount of $265 million and that 220 loan applications are in process for a total of $220 million.

The REA official said that in Georgia alone 69 exchanges with more than 26,000 stations had undertaken sizeable enlargement programs through the use of REA loans.

A future world of undreamed of convenience and comfort brought on by the development of electronic principles already known was envisioned by Mr. Darlington. In a talk entitled "Electronic Fantasy and Fact" he used present facts to predict future fantasy.

The telephone official demonstrat-

GEORGIA Association Directors (l. to r.): 1st row, J. P. GLEATON, Tifton; JOHN COZART, Monroe; JOHN BIRCHMORE, Comer; GLEN BRYANT, Hinesville; S. B. GREEN, Ellijay. 2nd row, LANE HUBBARD, Atlanta (retiring); E. H. HURST, Cairo; W. L. NEW, Commerce; H. W. VAUGHAN, Chickamauga. 3rd row, DOWNING MUSGROVE, Homerville; H. C. BOND, Reynolds; NELSON MAHONE, Fitzgerald; C. J. MATHEWS, Statesboro. W. K. MOSLEY, Atlanta; C. B. LANIER, Jr., West Point; J. M. EVITT, Ringgold, not present for photo.



OFFICERS of the Georgia Telephone Association (l. to r.): JOHN BIRCHMORE, Comer, president, re-elected; J. P. GLEATON, Tifton, 1st vice president; NELSON MAHONE, Fitzgerald, 2nd vice president; S. B. GREEN, Ellijay, secretary-treasurer, re-elected.

PEGGY GRACEN, Savannah, pins identification tag on LEON F. ROBERTS, director of information, USITA, one of the speakers at the Georgia meeting. Others are (l. to r.): J. F. CALLAHAM, Atlanta; C. J. MATHEWS, Statesboro; JOHN BIRCHMORE, Comer, association president; and EVERETT C. WEITZELL, head of the telephone operations and loan division, REA, one of the Georgia convention speakers.

construction and maintenance DIGEST

- 25-year battery
- Swing and save
- Profitable noise
- Wires' Shangri-la
- Supersonic splice

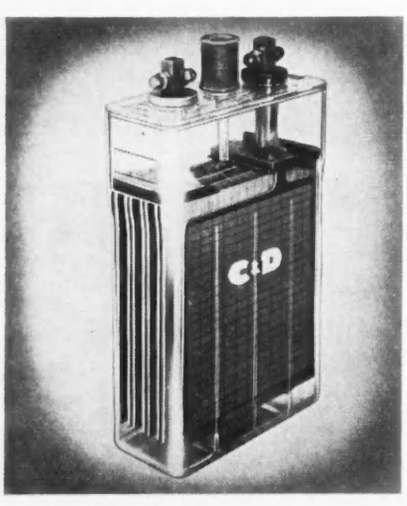
Published every month to help you get the most out of your materials and supplies dollar

by C. J. Reynolds, Stromberg-Carlson Company

The few dollars you spend on *reliable* equipment today will be repaid a hundredfold in lower maintenance costs for years to come. Protect your investment with the double guarantee offered by Stromberg-Carlson. First, leading manufacturers build this equipment, and guarantee it. Second, because we recommend and sell this equipment to the telephone industry, we *also* guarantee its performance!

Battery will live 25 years

A quarter of a century is the expectancy of an extra-life battery made by C & D Batteries, Inc. In full-float service, their PlastiCal (lead calcium grids) battery will serve your power needs faithfully —often well beyond its 25-year expectancy.

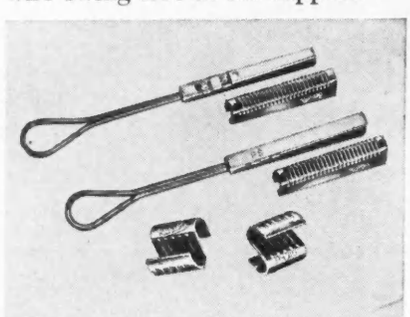


It'll be 1979 before you even have to *think* about replacing this extra-life C & D battery, if you install it now!

C & D Batteries' PlastiCell (high tensile, special alloy grids) battery offers reliable power supply at lower cost, with a life expectancy of 14 years.

Let drop wires swing free at support—they'll last longer

You prolong the life of drop wires when you use clamps that let the wire swing free at the support.



Type "PS" gives extra support for smaller wires. "D" clip is for snub attachments.

Such clamps are the Reliable Drop Wire Clamps offered by Stromberg-Carlson. These clamps give excellent support, eliminate sharp bends, and let you string and sag service drops before cutting wire.

Under load, they automatically tighten, assuring you a firm grip without damaging insulation of the wire.

FOUR TYPES are available:

Type "P"—for No. 17 or No. 18 AWG parallel.

Type "PS"—for No. 17 or No. 18 AWG dumbbell wire and most other construction to No. 20.

Type "PR"—for No.'s 14-16 AWG twisted pair and parallel suitable also for No.'s 17-18 reinforced parallel neoprene-jacketed drop wire.

"D" Clip—Used to secure drop wire to itself for snub attachments.

Noise can be money!

Take a business subscriber who has a telephone in some extremely noisy location—and who has finally decided to do something about it. Would you rather have him spend money in building a soundproofed booth—or give **you** the money as monthly income on a telephone which completely licks the noise problem?

The GAI-PHONE is such an instrument. It has a special transmitter that actually creates a "Zone of Quiet" around the handset—even in a spot as noisy as a boiler factory! It costs the subscriber less than a

booth—and you get the revenue!

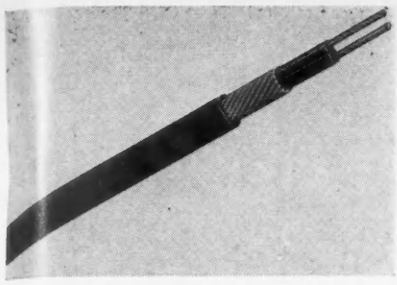
Ask us for complete details.

Here's a drop wire that hides its age

Samples of Teleprene® (neoprene jacketed) drop wires were strung where they would get lots of weather. After nine years, they still looked fresh and undaunted—and tests showed that these wires would give years and years **more** of good service!

The jacket is a tire-tread type neoprene compound which provides excellent resistance to sunlight, abrasion, oils, acid fumes, alkalies and other corrosive chemicals.

Conductors have Teleplate coating: lead, to resist corrosion, and brass plating over the lead, to provide enduring adherence of the

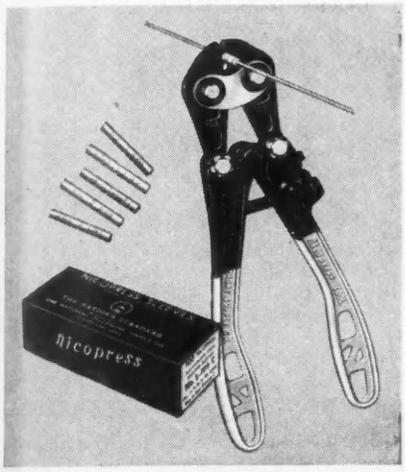


Available in parallel (shown here), twin parallel and twisted pair types.

high quality buna rubber insulation to the conductor.

High-speed splice outlasts the wire itself

You can cut half the time off splicing wires—and get a splice that will actually outlast the conductor itself!



Available for all types of wire: Nicopress sleeves. Special Nicopress tool is easy to use.

Because it is stronger than the rated breaking strength of the wire, you just can't pull apart a joint made with the Nicopress sleeve. It will withstand the toughest strains of vibration, yet makes a neat, compact splice that you can use on drop or inside wires as well as other lines. A tough inner alloy lining—harder than either the sleeve or the conductor – is the secret of Nicopress sleeves' strong grip.

To apply Nicopress sleeves quickly and simply, use the Nicopress tool, which is specifically designed to work together with the sleeves for high-speed splicing.

Distributed by

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

ed to the association a number of items using transistors. One device, which contained two transistors, created audible sounds from the electrical energy generated from a battery made of a small piece of wet blotting paper wraped around a dime.

He said that the army has developed a short range wrist-watch type transistor radio that would transmit voice with electrical energy supplied by the voice itself. The transistor, which is about the size of a small pencil eraser, can convert and amplify radio, sound and electrical waves; It is a step forward in the principle used in the early crystal and cat's-whisker radio set.

Telephone central offices of tomorrow, he predicted, would be able to serve more than 10,000 telephones with equipment occupying a space scarcely larger than a clothes closet. He said that the telephone of the future would probably have no cords and that dailing would be done by voice.

Experimental work is now being conducted on the "brain wave amplifier," which might enable two people in the same room to carry on a conversation in complete silence.

Mr. Darlington envisioned the home of the future as an electronic and ultrasonic house of marvels with such equipment as:

1. Solar and radioactive batteries on the roof to supply power around the clock.
2. Windows that are transparent during the day and luminous at night, providing a constant level of illumination.
3. Television cameras and picture-type screens for watching the nursery and doors.
4. Ultrasonic washing machines, dryers, dishwashers, disposal units, refrigerators and freezers.
5. Remotely controlled transistorized lawnmowers.

But worst of all he envisioned an automobile that will be driven by a transistor brain and even parking lots where cars will be parked by use of a punched card.

The new era of electronics would have a profound effect on our industrial and commercial lives with the increasing use of the electronic brain for the control of production processes and for business office work.

Fla. Independents Meet at Daytona Beach; Carl D. Brorein, Jr. Elected President

■ DAYTONA BEACH, FLA. — Over 411 telephone industry members attended the 48th annual convention of the Florida Telephone Association, and participated in a record-breaking two-day meeting at the Daytona Plaza Hotel.

The convention featured addresses by a carefully selected slate of speakers that earned the acclamation of each general session audience.

Industry speakers appearing at the meeting were: J. N. Johnson, 1954-55 president of the Florida association; Leon F. Roberts, USITA director of information, Washington, D. C.; J. G. Bradbury, vice president, operation, Southern Bell Telephone & Telegraph Co., Atlanta, Ga.

Non-industry speakers were: J. Saxton Lloyd, chairman, Florida State Development Commission, and Roger Early, science editor, WFLA Radio & Television, Longbeach.

Doug Wilkinson, of the Southeastern Telephone Co., presided at the Traffic Conference which featured addresses by Dan Shearer, general commercial and traffic manager, Inter-County Telephone & Telegraph Co.; and Mrs. Frances Hill of the Southern Bell Telephone & Telegraph Co.

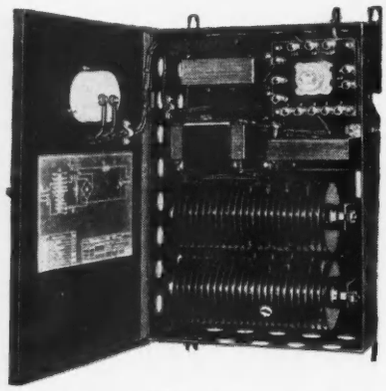
The joint Commercial and Plant Department Conference, with Robert D. Eshbaugh, Jr., chief engineer, Florida Telephone Corp., presiding, was highlighted by addresses given by: Fletcher W. Sturdivant, general commercial manager, Florida Telephone Corp.; Wm. B. Abernathy, equipment engineer, Inter-County Telephone & Telegraph Co.; Marcus Donaldson, chief engineer, Peninsular Telephone Co.; and Forrest L. Thorpe, Jr., customer relations supervisor, Southern Bell Telephone & Telegraph Co., Miami.

Mr. Thorpe, during his discussion of "The Solar Battery," forecast Americans some day will live in "sunpowered" homes — roofed with silicon to capture electricity from the sun.

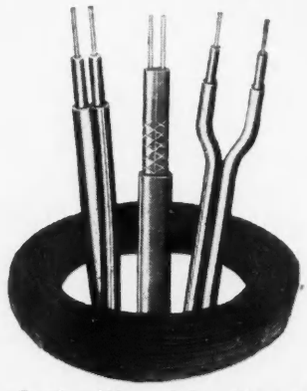
Solar power harnessed by silicon

Please Turn To Page 76

There's a Kellogg Warehouse near you



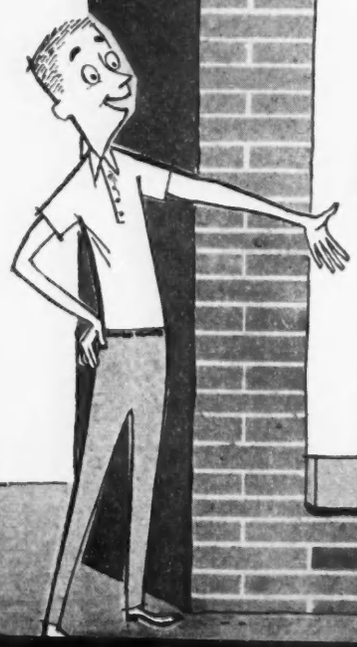
Long Storage Battery Life is assured by using the RB Electrox Automatic Charger—it maintains charging rate in proportion to drain on batteries. Humless operation permits charging while telephone system is in use. Made by SCHAUER MFG. CORP.



Long Service Life and Low Plant Costs go hand-in-hand with the installation of ENDURPRENE — The Neoprene Drop Wire available in Copperweld and Bronze. This flexible and easy to handle wire is made by GENERAL INSULATED WIRE WORKS, INC.

Test of Time proves high quality of Hemingray Insulators—a product of OWENS-ILLINOIS. Many sizes and styles available for immediate delivery. No. 17, shown, used for all exchange circuits—for toll and trunk circuits not exceeding 10 miles.

Simple, Quick and Sure!— For splicing two wires of different sizes, there's nothing simpler than using Nicopress reducing sleeves and the Nicopress 31-DC tool. Splices are always tight and strong. Made by the NATIONAL TELEPHONE SUPPLY COMPANY.



Six Kellogg warehouses and over 100 Kellogg distribution points from coast to coast assure you savings in shipping costs and fast delivery. You get the benefit of Kellogg's selection of top quality line supplies, too.

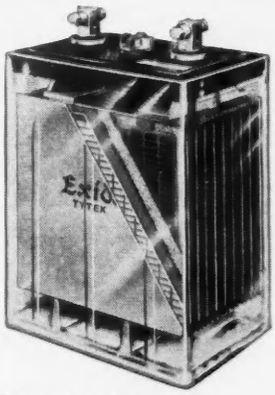
KELLOGG

A DIVISION OF I T & T

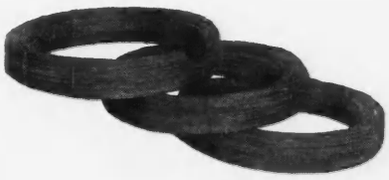
KELLOGG SWITCHBOARD AND SUPPLY COMPANY
A Division of International Telephone and Telegraph Corporation
Sales Offices: 79 W. Monroe St., Chicago 3, Ill.

Exchange Area Cable for aerial and duct use. TELECABLE* has polyethylene insulation and sheath, excellent transmission qualities. 202 Pair and smaller. Approved by REA. *TELECABLE is a trademark of WHITNEY BLAKE COMPANY.

Tailored for Needs of Telephone Industry the 630-T Volt-Ohm Milliammeter is designed for work inside on panel, checking circuits on pole, etc. Supplied with adjustable neck strap, hand strap and special test leads. THE TRIPLETT ELECTRICAL INSTRUMENT CO.



More Power, Less Space—the Exide-Tytex battery requires only one-half to two-thirds of the space needed by the conventional cell. Permits smaller racks in new installations. Exide Industrial Division, THE ELECTRIC STORAGE BATTERY COMPANY.



Save Three Ways . . . on materials, manhours, and maintenance with INDIANA STEEL & WIRE CO.'s Crapo HTL-85 and HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing Process, protected with heavy, ductile coating of zinc.

KELLOGG BRANCH WAREHOUSES AND OFFICES:

6000 W. 51st Street
Chicago 38, Illinois
REliance 5-5445

4501 Truman Road
Kansas City 1, Missouri
HUmboldt 7085

1663 Mission Street
San Francisco 3, California
Market 1-6011

410 N. Syndicate Ave.
St. Paul, Minnesota
Nestor 5878

1515 Turtle Creek Blvd.
Dallas 2, Texas
Prospect 5191

1555 West Fourth Street
Mansfield, Ohio
Mansfield 7-2816

KELLOGG BRANCH OFFICE:

406 S. Main Street
Los Angeles 13, California
Vandyke 6759

roofs will run every electrical gadget in the house from toaster and television set to washer, drier and air conditioner, Thorpe predicted and, he said, it will do all this "practically free." He said the day of the solar home may come two, 10 or 100 years from now — and, "if I had my way, it would be two."

Demonstrating a four celled silicon solar battery, Thorpe ran a small "wig and wag" motor, set off a radio oscillator and powered a telephone conversation between two persons, standing 50 feet apart.

"We're on the threshold of a new era, just as we were the day the first airplane was flown and the day the first horseless carriage ran," Thorpe said.

He said the solar powered home also will contain a special storage closet. In it, he said, some of the sunpower harnessed by day by the silicon roof will be stored to run electric gadgets at night.

Thorpe said a solar powered telephone system has been serving rural subscribers in Americus, Ga., for a month now. There, telephones hooked into 75 miles of line are serviced day and night by sunpower captured and converted by 432 silicon cells. The cells, set in a yard square frame, are high in the air atop a pole. Solar power stored by day runs the rural telephone system at night.

"Man has been trying to harness the sun since time began," Thorpe said. "Now — using silicon, a crystal derived from sand — he successfully has begun to capture and use sunpower, the most inexhaustible form of energy that falls on the earth."

SOLAR BATTERY — Forrest L. Thorpe Jr., Miami Southern Bell official, holds four celled solar battery capable of harnessing sunpower to work for mankind. The cells contain silicon. Light shed by sunlamp (left) substituted for the sun in the Daytona Plaza as Thorpe demonstrated the use of solar power to Independents attending 49th annual convention of the Florida Telephone Assoc.

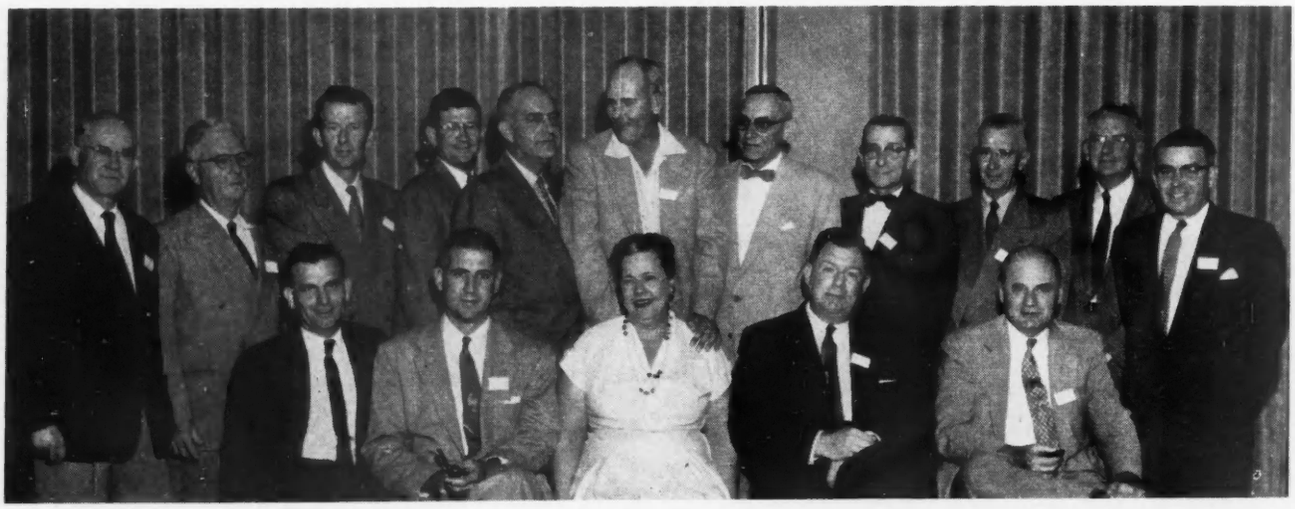
Silicon, itself, Thorpe said, "is the second most abundant element on the face of the earth." (Oxygen is first.)

A solar battery works on rainy or cloudy days, as well as in sunshine, because "it's the light from the sun, not the heat," the silicon cells convert into electricity.

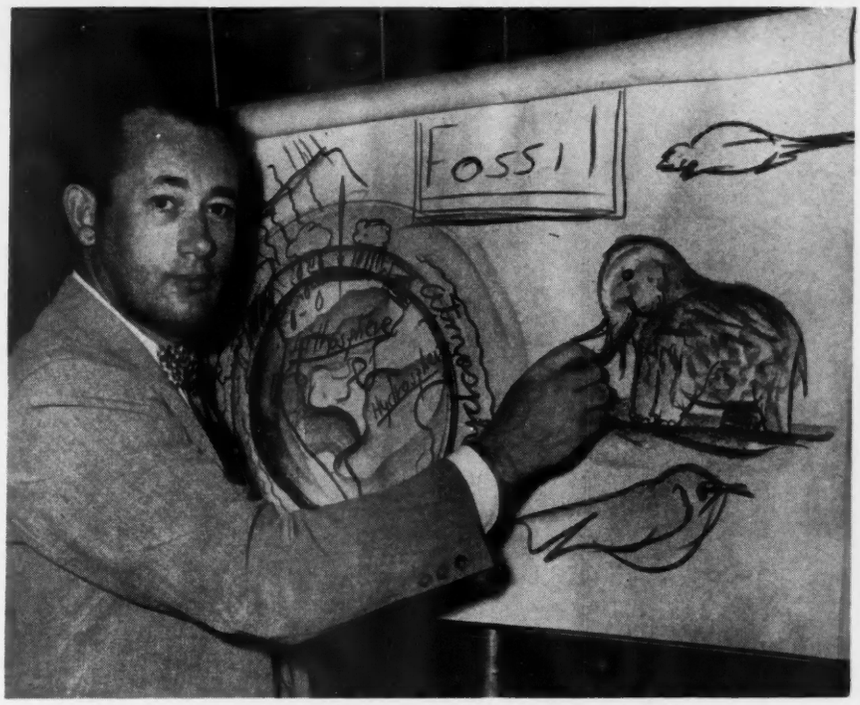
In his experiments, Thorpe substituted a sunlamp for sun. For "clouds" he used sheets of red cellophane, clamped between needlework loops. When the cellophane clouds were put between lamp and battery, the motor run more slowly.

"Only infrared rays penetrate clouds," Thorpe explained. "It's the same principle by which you can get sunburned on a cloudy day."

Science Editor Early told the



DIRECTORS of the Florida Telephone Association (seated l. to r.): B. A. GALLOWAY, Winter Park; C. D. BROREIN, JR., Tampa; JOSEPHINE POPPLETON, Tampa; J. N. JOHNSON, Ft. Myers; CARL D. BROREIN, Tampa. Standing (l. to r.): E. L. COX, Perry; R. W. SHRINER, Tampa; MAX WETTSTEIN, Ocala; OTTO WETTSTEIN III, Live Oak; BLAIR STONE, Tallahassee; J. L. McGEHEE, Marinaan; M. L. BARRE, Jacksonville; RALPH MANER, Tampa; W. A. BROWN, Tampa; P. E. BRANNER, Ft. Myers; J. K. GALLOWAY, Winter Park.



SCIENCE EDITOR ROGER EARLY used a blackboard and chalk to demonstrate "Development In Florida" to Florida Telephone Association members, guests.

Florida group — "Billions and billions of one celled animals once lived, died, then stuck together through the ages to form Florida which, so to speak, is a dead animal."

Early used a blackboard and chalk to illustrate the "most wonderful things" that happened even before Florida became a peninsula.

"The earth," he said, "is a constantly changing thing that's always trying to commit suicide, yet trying to give birth at the same time."

In less than an hour, Early took his audience back "several hundreds of millions of years" and used a rapid fire delivery to describe the formation of the earth, how it draws its energy from the sun and what causes seasons, different climates — and why there was an ocean outside the meeting room.

Discussing the 4-A switching system, Mrs. Hill told the traffic conference, "You have at your fingertips a remarkably fast and an accurate machine that will enable us to complete calls across the country in less than half the time required to do so with ringdown operation."

"However," she warned, "it is only as fast and accurate as the operator who uses it. The senders and markers, star performers of this equipment, work wonders — but only with good management by you."

Mrs. Hill emphasized that good management of the sender and marker consists mainly of: Careful dialing; rapid but rhythmic dialing; and, one complete operation without interruption.

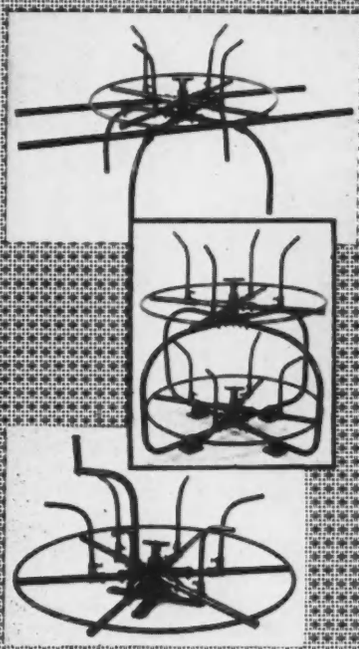
"Just as operators have had to learn new techniques of operating in order to handle toll dialed traffic," she said, "supervisors must learn new techniques of supervising the handling of dialed calls."

Describing the new TX plan for delayed toll calls, Mr. Shearer stated that under the new proposed TX plan there will no longer be an assignment of delayed calls to a TX position in a smaller office or to one of many point-to-point positions in a larger toll office on the basis of the destination of the call. Instead all delayed tickets in the office will be sent to one selected switchboard position, or ticket desk, or table, regardless of the routing or destination of the call.

"The new proposed TX plan," he said, "initially consists of holding all delayed tickets on which the subsequent attempt time is 20 minutes or less at the position where the original attempt was made. These tickets we all know constitute the large majority of delayed calls. The remainder, much smaller in number, are sent to the ticket table or desk or switchboard position where they are held until a subsequent attempt is due — then sent to an outward position for the attempt."

According to Mr. Shearer, this new

The Reel with the Cone Bearing that Never Wobbles



SUTTLE WIRE WHEELS

These sturdy, rigid, steel and malleable iron reels are designed especially for telephone use, both for paying out and taking up wire and light strand.

Eight models handle various size coils up to 400 pounds in weight. Fingers are adjustable for inside diametets from 14 to 29 inches.

CONE BEARING PREVENTS WOBBLE

There is never any spindle "wobble" with Suttle reels because the wheel settles down on the cone as the bearings wear, keeping it snug through the years.

ADJUSTABLE TENSION BRAKE

The friction brake on all Suttle reels is equipped with a big 5-inch wing nut for adjusting brake tension to any degree needed for the wires being handled. Keeps coils under control.

Sold by All Telephone Distributors

See Your SUTTLE Catalog

Serving Independent Telephone Men Since 1910

Suttle EQUIPMENT CO.

LAWRENCEVILLE ILLINOIS

NOW! AMERICA'S QUALITY POLES AVAILABLE FOR Immediate Shipment!

NORTHERN WHITE CEDAR

PENTA POLES

P & H Northern White Cedar are nature's sturdiest, lightest poles. Carefully selected and graded they are fortified with PENTA top-to-butt treatment to give decades of completely dependable service. One treatment ends termite, insect and decay troubles . . . eliminates costly replacements, too. For lower pole-line maintenance costs, for higher yearly profits . . - specify PENTA POLES.

WATCH FOR THIS BRAND!

P&H PENTA

Get the complete story TODAY! Write for FREE Pamphlet entitled "Full-Length Treated Northern White Cedar PENTA POLES"

PAGE & HILL, INC.

MINNEAPOLIS 3, MINNESOTA

ADD A FLOTROL TO YOUR ROTARY EQUIPMENT

for: • Better Voltage Regulation • Sizeable Power Bill Savings

A telephone exchange now using DC generators for charging the batteries can add one or more FLOTROLS and immediately obtain the precise voltage regulation characteristics of the FLOTROL for the entire exchange. The high efficiency of the FLOTROL will greatly reduce power consumption during those hours of the day when the FLOTROL alone is sufficient to carry the entire load; generators can be shut off during light load periods, thereby reducing the wear on the rotating equipment. By installation of FLOTROL capacity sufficient to carry the entire normal load, rotating equipment showing signs of wear can be saved for standby service, continuing its life indefinitely. The advantages obtainable from this type of installation are tremendous. For further information, send for Bulletin 161.

LORAIN PRODUCTS CORPORATION
1122 F ST. • LORAIN, OHIO

FLOTROL PARTNERS IN DEPENDABILITY SUB-CYCLE

arrangement of holding a delayed ticket on the CLR position for at least 20 minutes has several advantages.

"First," he said, "it will essentially give the CLR operator more responsibility in completing the call and we feel that most of our operators will accept this challenge and do their best to complete the call within this 20-minute period. Again, under this arrangement the customer is certain to receive his delayed reports much more promptly. One of the persistent complaints received from toll customers throughout the past years has been this one where he placed his call, the operator encountered some delay and promised to call him back and then never did. Again keeping the ticket on the CLR position in all cases where the next attempt will be due in 20 minutes or less will reduce considerably the number of tickets moving back and forth in the toll office. This is especially important in those toll offices that are not large enough or fortunate enough to be equipped with pneumatic tube delivery systems or with ticket rails."

Mr. Shearer stated the plan will operate in this manner: —

(1) All delayed tickets which require a subsequent attempt or subsequent report in 20 minutes or less are held at the position where the original attempt was handled. These include all reports of NC, no trunk, BY, extension BY and LK; also all initial reports of DA, OD, extension or room telephone DA and NRG party paged, and all reports of U few, LK few, WT few, etc. on which the operator did not leave word.

(2) On reports of U few, LK few, WT few, etc., the operator does not leave word on the initial attempt, but does so on the first subsequent attempt 20 minutes later.

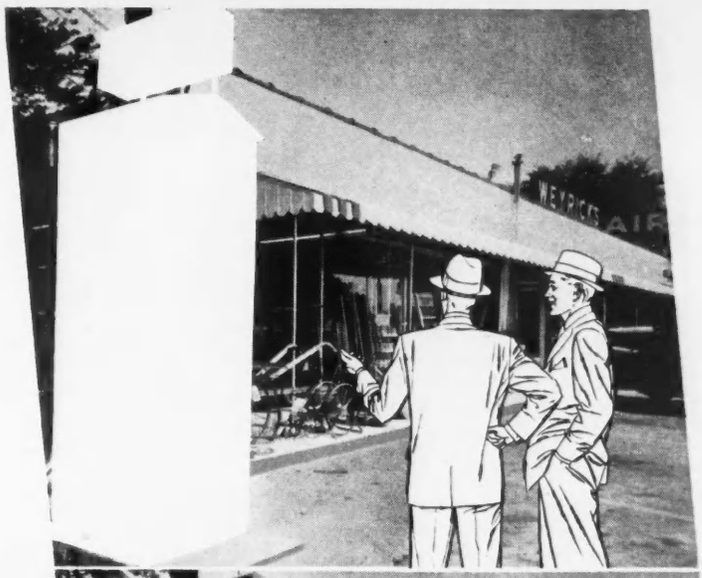
(3) On call encountering NC, the operator refers the case to the service assistant or supervisor for assistance in obtaining a circuit if still NC after 20 minutes from the initial report.

(4) If a delay is posted, the tickets involved may be removed to the ticket table or sent to any specified position for handling, as warranted by conditions.

"In general," he said, "a maximum of four operator numbers is assigned for each toll office unit, as determined by delayed call characteristics and volume. In addition to the regular WII number, separate WII numbers

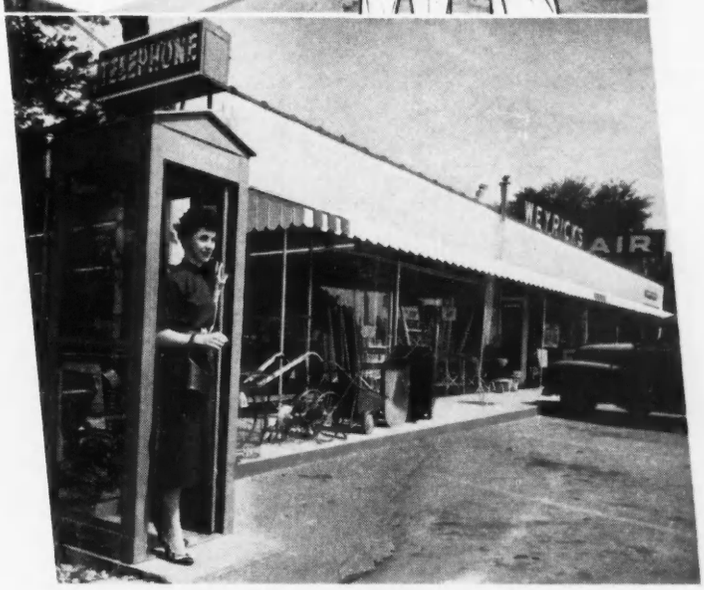
Idea...

An Indiana Independent, alert to new business opportunities, spotted this service station and thought it would make a likely paystation site. He was *right!* This location . . .



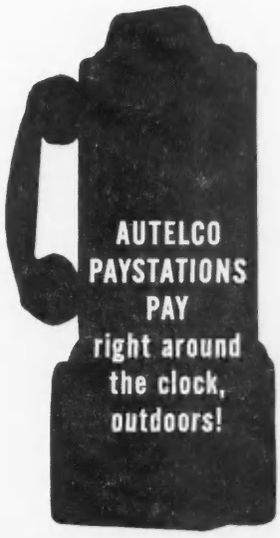
Pays Off

an average of $82.50 per month, and is proving a great convenience to service station customers. Remember . . .



For You...

too, locations like this could be paying rich rewards. Now, while the weather is good, go out and check the service stations in your area—and the drive-ins, highway junctions, bus stations, motels, and trailer camps, too. Install Autelco Paystations in substantial booths; mark them with big, colorful signs—and you'll surely build paystation revenue. Write for Catalog TM 4078-B and booklet, "How to Make Paystations Pay." *Address: Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*



AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

construction and maintenance DIGEST

- **Protection plus**
- **Insure your power**
- **Keep batteries young**
- **Real cool sitting**
- **Steady power source**

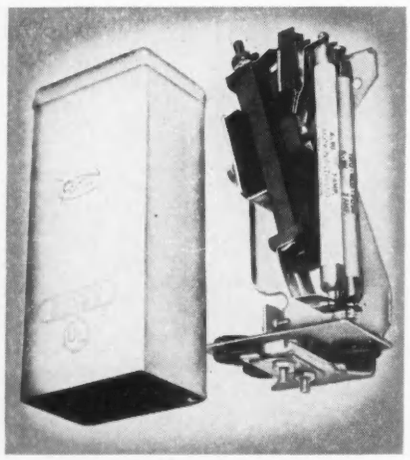
Published every month to help you get the most out of your materials and supplies dollar

by C. J. Reynolds, Stromberg-Carlson Company

The few dollars you spend on *reliable* equipment today will be repaid a hundredfold in lower maintenance costs for years to come. Protect your investment with the double guarantee offered by Stromberg-Carlson. First, leading manufacturers build this equipment, and guarantee it. Second, because we recommend and sell this equipment to the telephone industry, we *also* guarantee its performance!

The Cook RO-9U sub-station protector

Protection plus—that's Cook Electric Company's type RO-9U sub-station protector.



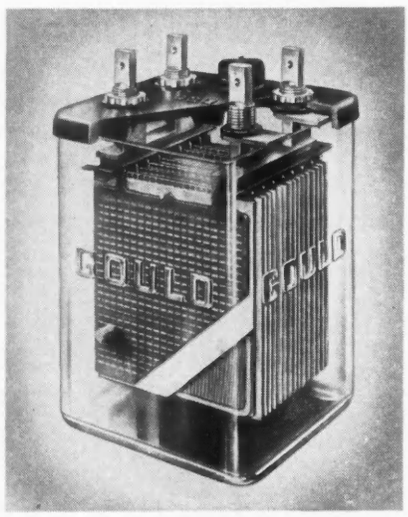
The most highly protective sub-station protector available.

This rugged unit consists of a heavy Bakelite base, two 7-amp. ceramic fuses, two famous Tru-Gap dischargers and two secondary dischargers which will ground a fault current when the fuses blow. These are all mounted on a sturdy steel bracket and covered with a heavy gauge, weathertight, zinc hood.

For the best in fused sub-station protectors, order the RO-9U.

Insure your power supply

Because Planté batteries practically last forever...providing stand-by power that never fails...they're the best operating insurance you



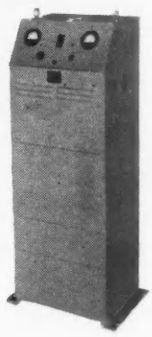
A sure, dependable supply of power when you need it. That, briefly, is the story of this Gould Planté battery.

can buy. In switchgear, signal and alarm systems, or emergency light and power applications, these lead batteries have rolled up amazing performance records . . . are famous for their ability to deliver a powerful surge or a steady flow of current the instant it's needed. Make sure you're in operation . . . always.

How to stretch out the useful life of your batteries

Keep your batteries charged at just the right level, and they'll give you added years of service.

You can maintain the right charge automatically, with the new Raytheon "high-rate" RectiChargeRs*.



This constant potential battery charger, like all Raytheon RectiChargeRs, operate 100% automatically. It has special dry disc rectifiers plus an exclusive Raytheon Magnetic Amplifier Control Circuit which maintains precise DC voltage output at any load in the presence of wide changes in AC input voltage . . . increases battery life by eliminating over- and under-charging.

It handles inexpensively all normal power requirements and allows the battery to "stand by" fully charged to meet all emergency demands. You get noiseless current at constant voltage by simple connections to a power outlet and your battery. It is ideally suited for use with systems requiring power for 22/24 cells of battery.

*Reg. U.S. Pat. Off.

Cane-seat chair keeps operators cool, comfortable

This operator's chair has a cane seat, which is much cooler, cleaner and more comfortable than other types. It retains all the posture advantages for which Sturgis is famed. It is called the Sturgis SC-240.

The posture-curved, well-cushioned backrest is covered in genuine leather.

The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.

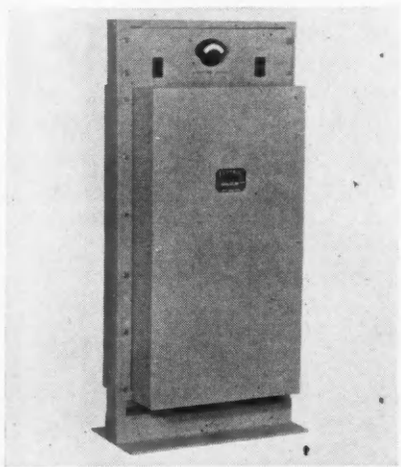
Battery charger maintains constant voltage within ± 1%

To keep your batteries in good operating condition, and to prevent their deterioration, you need a steady charging voltage.

The Flotrol single-phase battery charger is an entirely automatic charger of the floating charge type. It provides an output voltage that is constant within ± 1%, from 10% of its rated load to 100%.

You save on maintenance, because the Flotrol has no moving parts. Its regulation is controlled by saturable magnetic reactors.

If overloaded, the Flotrol automatically changes from a constant voltage-type charger to a constant current-type charger. This protects both the battery and the Flotrol itself.



Quiet, efficient Model 1200-B Flotrol.

Compensation for variation in input voltage is automatic and practically instantaneous.

The operation of the Flotrol does not depend on the use of tubes, relays, motors or other expendable equipment.

For efficiency and economy, ask your Stromberg-Carlson representative about the Flotrol single-phase constant voltage charger.

Distributed by

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

may be provided for WII reports on collect calls and on calls requiring T & C, respectively. The latter category includes calls for hotels. One TX number is required for reports on calls not covered by the WII numbers. Office in multi-unit cities may require an additional number for universal TX. In single unit cities which can be reached by dialing, the TX number should be 50."

Mr. Shearer stated that all WI and TX trunks should be multipled throughout the switchboard. They are answered by an outward operator and should be given preference over recording trunk signals. If necessary, inexperienced operators may be instructed not to answer TX signals.

"When any TX signal is answered by a CLR operator," he said, "she will use a new ticket for recording these calls and if necessary obtain additional details via interposition trunk to the delayed ticket table. The ticket on which the call is completed is sent to the ticket table where the matching original ticket is located and scratched. However, if it was necessary to reach the ticket table previously for additional details, the original ticket would have been scratched at the time the details were given. Tickets requiring subsequent attempts are sent to the switchboard two or three minutes before the attempt is due. When the ticket arrives at the switchboard, an immediate attempt is made and, if the call is not completed, the ticket is held or returned to the ticket table the same as on an initial attempt."

Mr. Shearer recommended that the various companies and traffic organizations in Florida Telephone Association give considerable thought to the new TX plan and attempt to put it into operation at their first opportunity.

"In any case," he said, "it would be well to initiate, as soon as possible, the first step in this plan, that of leaving all delayed tickets in the CLR position when the next attempt time is 20 minutes or less. This phase of the plan can be put into practice well ahead of the remainder of the plan and the other details such as the ticket table, trunking plans, etc., can be worked out later . . ."

Discussing "Toll Facilities And New Techniques," Mr. Donaldson reminded his listeners that "when we leave the open wire and cable circuits, we look to electronic equipment for our additional circuits."

"Tremendous gains," he said, "have been made in the development of carrier equipment. I well remember when it required four or five 19-inch racks to mount 12 channels. Now, one of these same racks will mount 36 channels, or more. Not only that, but the improvement in the circuitery of the new carriers, the

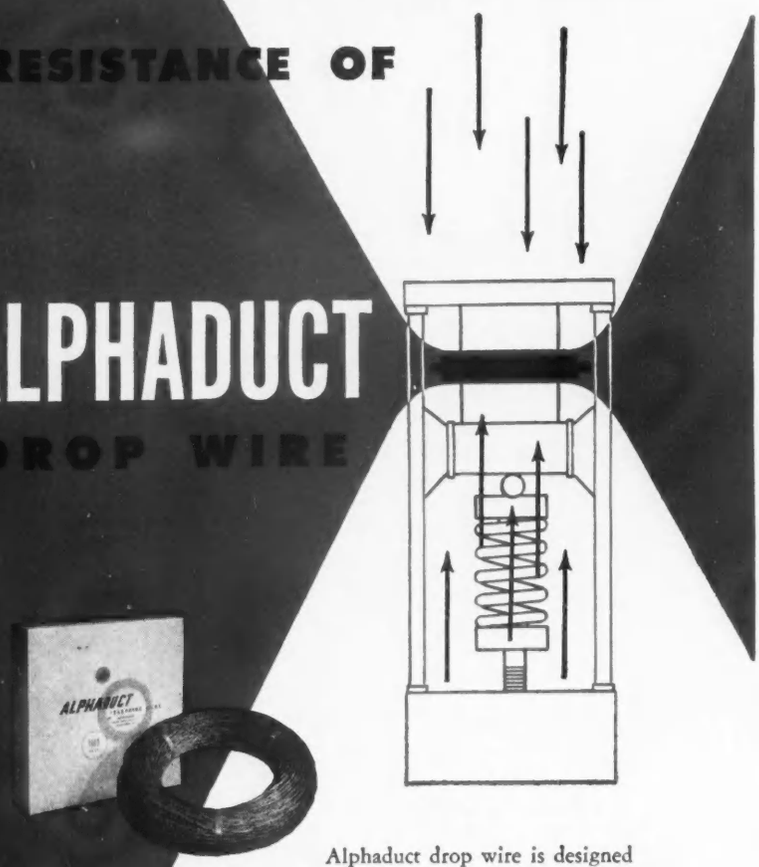
J. N. JOHNSON (right) past president of the Florida Telephone Association, discusses recent meeting with Miss JOSEPHINE POPPLETON, secretary-treasurer of the association, and CARL D. BROREIN, JR., president-elect.

1500 pounds

MINIMUM COMPRESSION RESISTANCE OF

ALPHADUCT

DROP WIRE



Alphaduct drop wire is designed and built to be the longest lasting drop wire you've ever installed. It's tested . . . completely, thoroughly and often to make sure that every single coil is up to Alphaduct's rigid standards.

Here's how the insulation is tested to make sure it won't crush.

Short lengths of Alphaduct are placed between the steel plates of a compression testing machine. These plates are then forced together at uniform speed until the insulation crushes. Alphaduct parallel drop wire has to withstand a minimum load of 1500 pounds before it breaks. Each conductor of Alphaduct twisted pair will withstand a 1000 pound pressure.

You don't have to worry about a little rough handling breaking down this kind of tested insulation. Try Alphaduct drop wire. It's dated, so you can see for yourself the extra wear it provides.

ALPHADUCT WIRE AND CABLE COMPANY • MILLTOWN, NEW JERSEY
NATIONAL DISTRIBUTORS • LEICH SALES CORPORATION, CHICAGO, ILLINOIS
REGIONAL DISTRIBUTORS • PANKEY SUPPLY CO., CHARLOTTESVILLE, VA.
THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO

GENERAL SYSTEM

more stable oscillators, better filters, the improved dialing or signaling equipment are in the new equipment."

Mr. Donaldson warned that "This does not mean that you can go down to the dime store and buy a carrier, put it in service, and expect it to work."

"It requires good engineering and good maintenance to obtain the best results," he said. "I am wondering if the telephone people can see the handwriting on the wall and see the direction we are going, and training themselves and their personnel to handle these new facilities. By the time that is done, the use of electronic equipment will be three-fold, and further, more economical ways will be found to provide the additional circuits required to adequately care for the growth in circuits . . ."

Discussing microwave, Mr. Donaldson stated the Bell companies are providing microwave known as the TD-2 System, and they are using the L-type carriers for channelizing these radio circuits.

"By having six broad band circuits," he said, "they can obtain as many as 3600 circuits on these systems. But due to the cost of these systems, we of the Independent field should look for equipment that can be proven in on our short hauls."

Mr. Donaldson reported that with the assistance of Independent companies, the manufacturers have "come up with this answer, and now we have microwave circuits that can be channelized with 120 circuits per radio circuit."

"In the near future," he said, "we will have on the market equipment that will provide as many as 360 circuits per channel. Just because this is a new medium, don't go and buy one just because you would like to have something new. Figure the cost of the microwave versus the other type of toll facilities, and you will find that it will cost you less if you take into consideration the future growth and any distance of over 20 miles."

In concluding his address, Mr. Donaldson emphasized that "all the outstanding improvements in the telephone industry have been accomplished with the development and furtherance of electronic equipment.

"In the years to come," he said, "you will find this program accelerated year by year, and certainly with all of us having this information, we

"You need good eyes to see that oasis, it's way down at the next pole!"

A slight exaggeration? Perhaps. However, it is a long way between poles . . . when they're strung with Amertel 135.

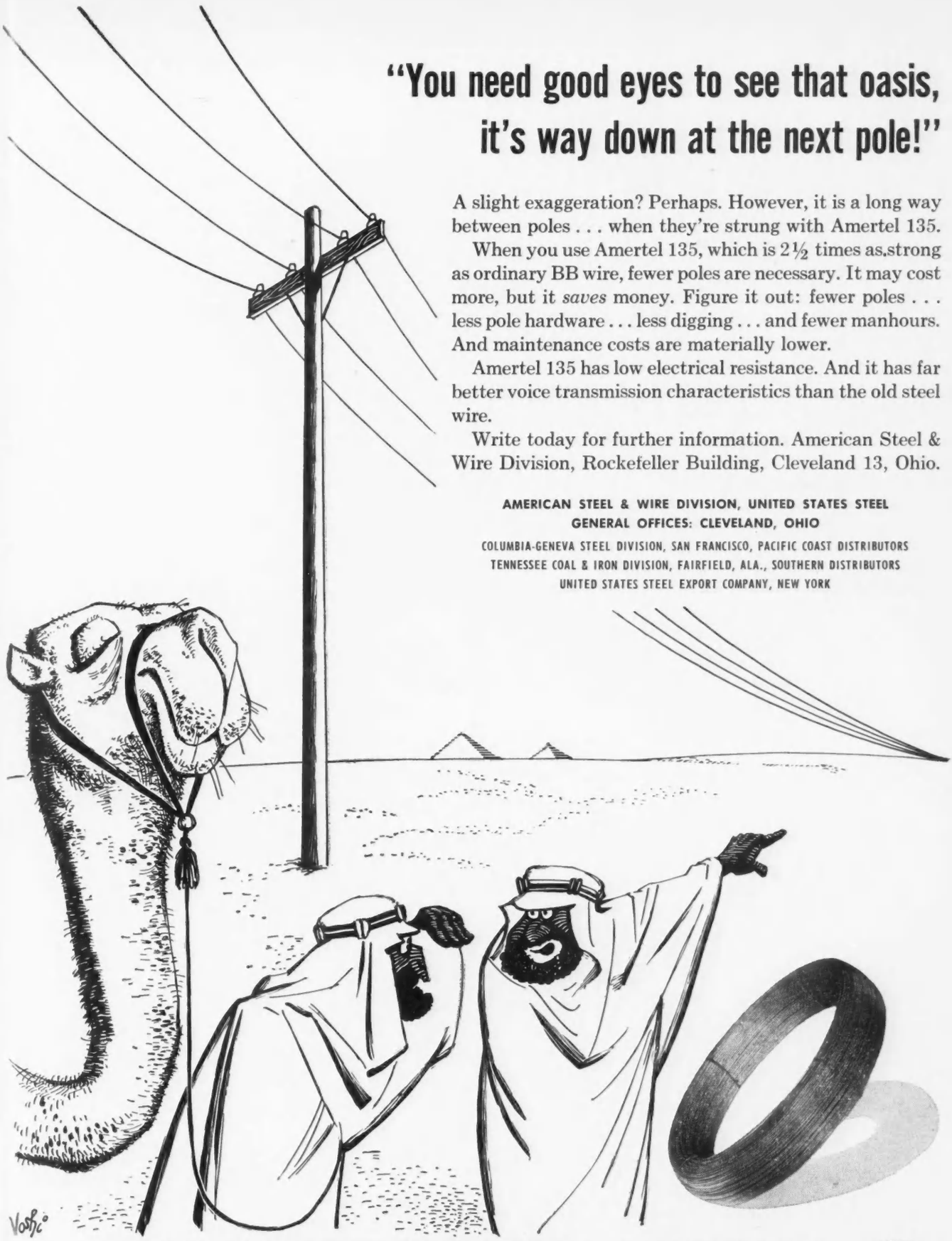
When you use Amertel 135, which is 2½ times as strong as ordinary BB wire, fewer poles are necessary. It may cost more, but it *saves* money. Figure it out: fewer poles . . . less pole hardware . . . less digging . . . and fewer manhours. And maintenance costs are materially lower.

Amertel 135 has low electrical resistance. And it has far better voice transmission characteristics than the old steel wire.

Write today for further information. American Steel & Wire Division, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



USS TIGER BRAND AMERTEL

TELEPHONE & TELEGRAPH WIRE

USS

UNITED STATES STEEL

NOW... CHANCE PIKE POLES ARE LAMINATED!

For greater uniformity... greater rigidity!

Now...Chance Pike Poles are made by bonding together carefully selected Douglas fir boards. Laminated Pike Poles have many advantages over the old, single board pike pole. They're more rigid. They're more uniform. Each board reinforces the other.

SAFETY PIKE — *Point can be reversed as shown in circle, for safety in handling and transporting between jobs.*

PLASTIC PROTECTED

Chance *laminated* Pike Poles are available with tough Maplac plastic coating. Splintering of the wood is eliminated. Lost-time hand injuries, caused by splinters, are avoided. *IT PAYS TO BUY HIGH QUALITY IN A PIKE POLE.* Only on a Chance pike pole will you find the steel reinforced butt which protects the end of the pike. And only *laminated* Chance pike poles are available with Maplac protection.

Write for the full story today.

CT55-1A

A·B·CHANCE CO·

CENTRALIA, MISSOURI

SAN FRANCISCO, CALIFORNIA

should begin our training program for our personnel, management, and engineering in the use of the various devices, so that improved and economical service can be provided for all of our subscribers."

During his discussion of "Selling," Mr. Sturdivant told the Florida conventioners that "Although, we have held orders for new service and main stations and upgrades, I believe that it is our responsibility to provide more adequate service to our present customers. It is my belief that it is a sound, economical business principal which will stabilize our industry and bring about the prestige which we deserve."

"We must realize," he said, "that because we are a business without competition, it does not warrant lack of initiative. The time has come for us to plan a sales program and work the plan . . .

"We are fortunate in our business not having any organized competition. On the other hand, it is possible that some of the spirit and determination to progress has been taken away. We have all been accused by our customers of having a business with a guaranteed profit, so why should we care if service is good or bad. However, this feeling of our customers has changed during the last few years. We now have an excellent opportunity to go to our customer and sell additional service . . ."

Referring to the direct distance dialing network that was cut into service on Nov. 6, by Inter-County Tel. & Tel. Co., Mr. Abernathy described the North Electric Company's "Autolizer" Ticketing System.

Carl D. Brorein, Jr., was elected president of the Florida group. Other officers are: Mitchell N. Drew, first vice president; Max Wettstein, second vice president; and Josephine Poppleton, secretary-treasurer.

Directors are: M. L. Barre, Jacksonville; H. A. Bishop, Starke; P. E. Brannen, Ft. Myers; Carl D. Brorein, Tampa; Carl D. Brorein, Jr., Tampa; W. A. Brown, Tampa; Mrs. Allene M. Drew Cantey, Quincy; E. L. Cox, Perry; Mitchell N. Drew, Quincy; B. A. Galloway, Winter Park; J. K. Galloway, Winter Park; J. N. Johnson, Ft. Myers; Ralph Maner (Representing Mfgrs.), Tampa; J. L. McGehee, Marianna; E. M. Menendez, Tallahassee; Josephine Poppleton, Tampa; J. L. Sharit, Port St. Joe; R. W. Shriner, Tampa; Blair C. Stone, Tallahassee; Max Wettstein, Ocala; Otto Wettstein, III, Live Oak. Hugh C. Macfarlane, Attorney.

Wisconsin State Tel. Association Stages First Management Conference at Eau Claire

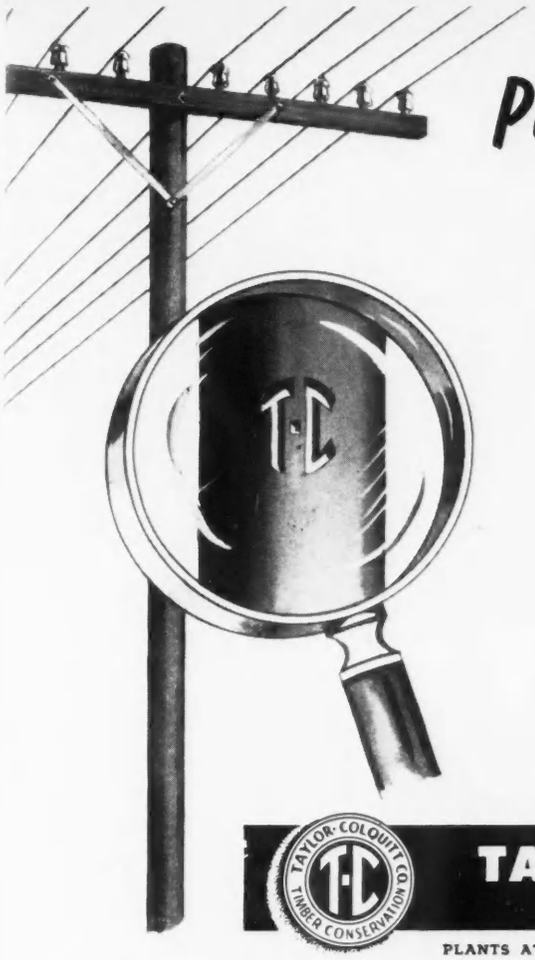
THE WISCONSIN State Telephone Association recently staged its first Fall Management Conference at Eau Claire. The two day affair drew an attendance considerably in excess of expectation, according to E. L. Beyl, program chairman and president of the Osceola Farmers Mutual Telephone Co. He reported that 128 people representing 68 operating telephone companies and 11 non-operating organizations registered.

The conference was directed particularly toward the smaller operating companies. Most topics were handled through panel discussion with questions from the floor. Chairman Beyl pointed out that in setting up the schedule, the committee intentionally left slack so that adequate time would be permitted for informal discussion. He said the result marked the effort as completely satisfactory.

Panels which proved exceptionally popular included one relating to Articles of Incorporation and By Laws, Operating Polices and Tariffs, a panel which had REA borrowers relating their experiences with the program, and a panel conducted by staff members of the Public Service Commission of Wisconsin and dealing with telephone utility regulation.

Attorney William A. McNamara handled the legal aspects of incorporation and by laws, L. F. Seawell, Wisconsin field representative of REA pointed out the obligations of directors and management in his reference to operating policies, and D. W. Chase, commercial superintendent of the General Telephone Co. of Wis. gave such an excellent presentation regarding tariffs that he was recalled for an "encore" during a later session.

Chairman Beyl, H. W. Drew, president of the Marquette-Adams Telephone Co-Operative, Oxford, and George Griffin, president of the Am-



Put 'em up and forget 'em!

Vapor-Dried Poles

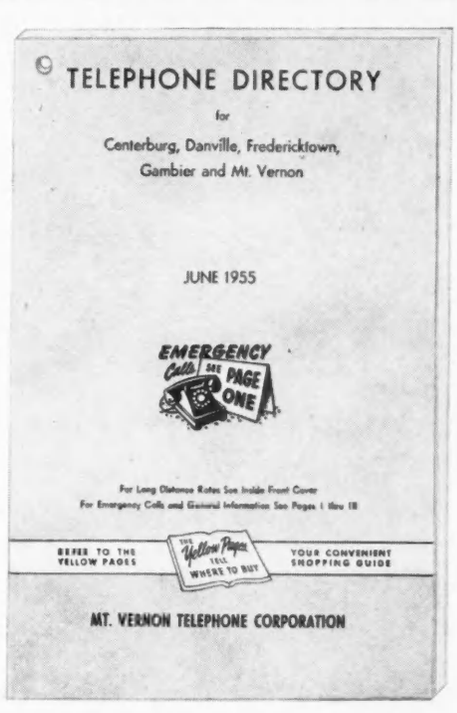
That's what T-C pole users do. Here's why . . . they know that T-C's exclusive Vapor-Drying process permits more uniform penetration of creosote or penta. They know that this deeper, more uniform penetration enables Vapor-Dried poles to retain their preservative longer . . . thus making them the most durable available. They know they can install T-C poles . . . one or a thousand . . . and get long years of trouble free service from each one.

Join the ever-growing list of telephone companies who specify T-C Vapor Dried poles and put 'em up and forget 'em.

Distributed by AUTOMATIC ELECTRIC SALES CORP. and LEICH SALES CORP.

TAYLOR-COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA


TELEPHONE DIRECTORY
for
Centerburg, Danville, Fredericktown,
Gambier and Mt. Vernon
JUNE 1955
EMERGENCY Calls See PAGE ONE
For Long Distance Rates See Inside Front Cover
For Emergency Calls and General Information See Pages 1 thru 18
REFER TO THE YELLOW PAGES
Yellow Pages WHERE TO BUY
YOUR CONVENIENT SHOPPING GUIDE
MT. VERNON TELEPHONE CORPORATION

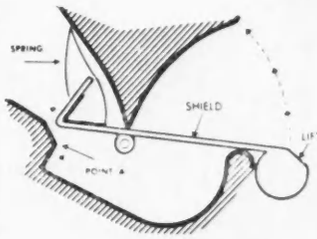
Mt. Vernon Telephone Corporation, Ohio directory printed by

R. R. DONNELLEY & SONS COMPANY

350 East Twenty-second Street, Chicago 16

Don't Be Cheated By Coin Return Chute Stuffers

Install **THE SHIELD*** Coin Return Protector



Deliberately plugged Coin Return Chutes cut Pay Station revenue because many customers assume that telephones are out of order if their coin is not returned. They are also a source of bothersome complaints, and can lead to substantial losses if refunds claimed by customers are not covered by collections from the station (as a result of stuffed chutes). Aware of this drain on revenue, the world's largest telephone company is replacing its entire coin return chute mechanism in almost all pay stations . . . at considerable expense . . . in an effort to eliminate chute stuffing. Now, with The Shield Coin Return Protector — the *only* anti-stuffing device available to independent telephone companies — you can gain similar protection, on any make pay station, at less than one-third the cost of replacing entire chute mechanisms.

***Patent Pending WRITE FOR CIRCULAR 455-A**

BUCKEYE TELEPHONE & SUPPLY CO.
1250 KINNEAR ROAD COLUMBUS 21, OHIO

WISCONSIN'S Lieutenant Governor WARREN P. KNOWLES seated at the head table with Wisconsin Association President J. F. BENJAMIN, Cumberland Telephone Co., and MRS. KNOWLES, reviews the program with Conference Chairman E. L. BEYL of the Osceola Farmers Mutual Telephone Co.

THE FALL CONFERENCE, conducted by the Wisconsin State Telephone Assoc., attracted women of the industry. Pictured above in the discussion of mutual problems are left to right: FRITZ JOHNSEN, plant manager, and MRS. EMMA LINDQUIST, secretary-treasurer, Hager City Telephone Co.; MRS. JOE KEATING, secretary, Thorp Telephone Co., and MRS. JAY NELSON, whose husband is president of the Hager City Telephone Co.

THE BALDWIN TELEPHONE CO. merited honors for sending the largest representation to the Wisconsin Association's Fall Conference — eight directors and officers being on hand for the event. Three of the eight participating in discussions include left to right: DR. J. R. BERGGREN, secretary; GLEN MARTELL, manager; and CHARLES HANSON, director of the company.

ery Telephone Co., were able to report the progress and experiences of their organizations with REA loans. H. J. O'Leary, chief rates & research department, D. J. Nicholson, engineering department, and R. S. Butler, accounts and finance department of the Public Service Commission treated the various phases of telephone utility regulation. The panel involving representatives of the Public Service Commission proved so popular that audience response indicated another of this type should be awarded a complete morning rather than an hour and a quarter, as it was on the program.

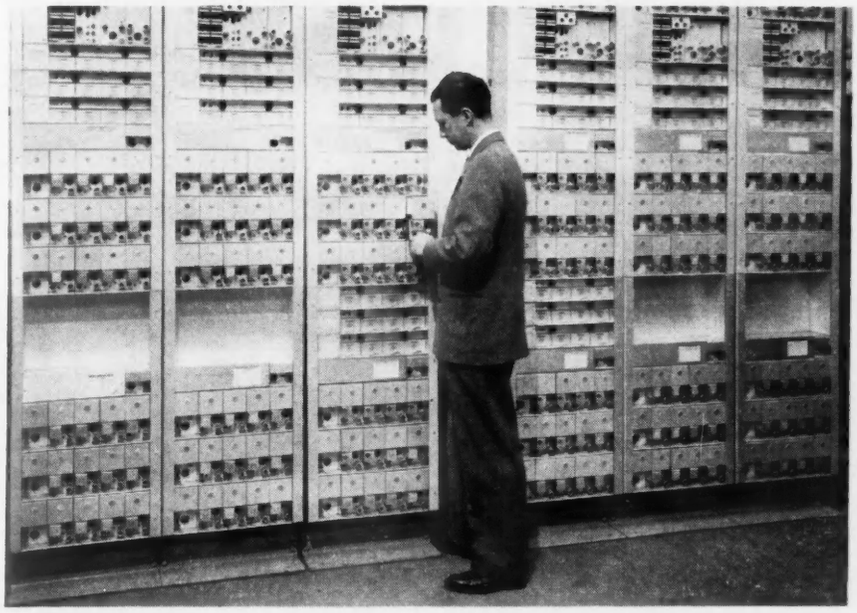
Other items receiving attention included the development of directory advertising revenue by C. V. Hammer of Hammer's Modern Directory Service, Faribault, Minn.; Customer Toll Dialing, by W. D. Peterburs, staff supervisor in Charge of Customer Relations, Wisconsin Telephone Co.; and Connecting Company Relations by N. F. Leifer, manager, Vernon Telephone Co-Operative, Westby.

Al Lindekugel, division commercial manager of the La Crosse Telephone Corp., spoke of the vast field of additional telephone revenue, which awaited management desiring to go out to develop it. In his presentation Lindekugel not only spoke of the prospective revenues, but identified the costs and investments required to accomplish these. Among examples he cited the installed cost of outdoor telephone booths and then in turn identified the monthly return that could normally be expected.

While both days of the session were confined to business and problems of small companies, Wednesday evening was set aside for a dinner and talk by Wisconsin's Lieutenant Governor Warren P. Knowles, who discussed, "The World of Tomorrow." The Lieutenant Governor indicated by his remarks that the country was moving ever forward and organizations serving the public must keep pace with it if they are to survive. He complimented the spirit of the Association's membership.

Assisting Chairman E. L. Beyl in arranging the conference, were Harry Thompto, New Auburn Telephone Co.; A. B. Quam, Shell Lake Telephone Co.; Jacob Maciosek, Chequamegon Telephone Co-Operative; Wm. A. Steventon, Cream Valley Telephone Co.; and J. M. Keating.

Equipment For the "Texas Tower"



RADIO CHANNELIZING equipment to be installed on the first "Texas Tower" 110 miles out in the Atlantic Ocean is checked by an engineer before shipment from the Lenkurt Elctric Co. plant in San Carlos, Calif. The two carrier terminals shown here will provide 72 voice channels on a single microwave system.

Lenkurt Carrier Selected for Canada's DEW Line

LENKURT CARRIER equipment has been selected to provide communications circuits for the Distant Early Warning (DEW) line now being constructed in Northern Canada to help guard this continent against surprise air attack.

Lenkurt also is providing the carrier equipment for the Texas Tower, a "radar island" nearing completion out in the Atlantic Ocean, 110 miles east of Cape Cod.

Type 45BX is the radio carrier system being used for both the DEW line and Texas Tower projects, according to the announcement by Lenkurt Electric Co. at San Carlos, Calif.

This carrier was developed specifically for microwave telephony by Lenkurt last year as one of the systems in its 45-class carrier family. More than 30 microwave installations utilizing this type of channelizing equipment already are in use by Independent and Bell System telephone companies.

Originally designed to carry a relatively small number of circuits, Type 45BX was redesigned early this year so that it now will accommodate from 12 to as many as 360 voice channels on a wide-band microwave system.

Lenkurt revealed that it will begin making 45BX shipments in the near future for the DEW line radar network being constructed in the frozen country north of the Arctic Circle.

This string of radar stations will extend from Alaska in the west to Greenland in the east. They are designed to flash the earliest possible warning of enemy bombers to Canadian and U.S. cities and to alert interceptor forces.

Lenkurt already has shipped the carrier for the Texas Tower installation. This Texas Tower is envisioned as the first of a series of offshore radar warning stations to be built on the continental shelf from Nova Scotia to the Virginia Capes.

Jack Wyatt Joins Whitney Blake Co.

JACK HOLMES WYATT has been appointed a sales representative for Whitney Blake Co., New Haven 14, Conn. He will serve the Detroit area from the company's new office at 15324 Mack Ave., Detroit 24, Mich.

A native of Detroit, Mr. Wyatt attended Michigan State University. Before joining Whitney Blake, he was a district manager of General Dynamics Corporation's Electro Dynamic Division.

His earlier experience includes sales engineering positions with Manco Manufacturing Co., Bradley, Ill., Michigan Chandlier Co., Detroit, Mich., and National Electric Products Corp., Pittsburgh, Pa.

Scott and Yonkers Named Graybar Directors

WILLARD E. HENGES, president of the Graybar Electric Co., Inc., has announced the election of S. W. Scott and E. R. Yonkers to the board of directors of the company.

Mr. Scott is Graybar's Pacific district manager. He has been with Graybar since 1928 when he started as a supply salesman. He has also held the positions of manager, small appliance department; manager, merchandise department; hearing aid specialist; district commercial manager; and district sales manager. He has been district manager since February, 1951.

Mr. Yonkers has been transferred to the Eastern District as assistant district manager. Prior to this move, he had held the positions of district manager of the Ohio Valley district and district manager of the Wolverine district. Mr. Yonkers started with the company in 1933 as a salesman at Wichita.

M. C. Royalty Joins Stromberg-Carlson Co.

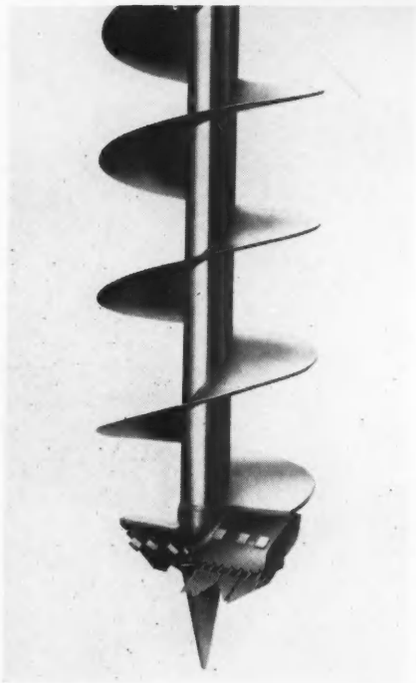
APPOINTMENT of Marion C. Royalty as chief carrier-microwave sales engineer of Stromberg-Carlson, a division of General Dynamics Corp., has been announced by T. C. Thompson, general telephone sales manager.

Mr. Royalty is a native of Lubbock, Texas, and an electrical engineering graduate of Texas Technological College, where he also served as an instructor. For three years he was a member of the technical staff of Bell Telephone Labs., working on the development of airborne radar equipment. Prior to joining Stromberg-Carlson he served for nine years as transmission and protection engineer of General Telephone Company of the Southwest.

M. C. ROYALTY

Mr. Royalty holds a Texas professional engineers' license, and is a member of the Institute of Radio Engineers, the American Institute of Electrical Engineers, and the National Association of Corrosion Engineers.

NEW PRODUCTS' SHOWCASE



Augers

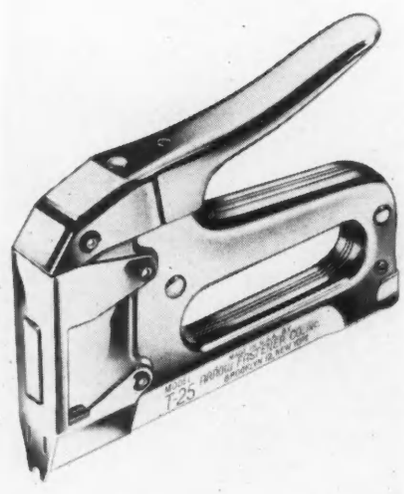
A NEW LINE of augers for diggers has been announced by J. H. Holan Corp.

The augers are available for digging holes from eight inches to 22 inches in diameter and eight feet deep. Auger diameters are 8, 9, 10, 12, 14, 16, and 22 inches.

There are three types of augers—anchor, short flight and long flight. The anchor augers are used for digging anchor holes at an angle. Short flight augers are six feet long with 3 feet of flighting; long flight augers are 6 feet long with 5½ feet of flighting.

Holan augers can be furnished with either the Holan Standard Head or Pengo Head. Holan cutter head and points are grooved so they fit together for perfect alignment. Pengo cutter heads feature a twin-helix pilot bit that provides two equal cutting areas; this results in balanced thrust and automatic centering of the head. Both heads are designed to give straight holes and to reduce wear.

The new line of augers was developed for use with Holan 4401 mechanical and hydraulic portable earth borers.—For complete data, ***Check New Product* 891.**



New Staple Gun

ARROW FASTENER CO. has introduced a completely new Staple Gun, the T-25, for fastening low voltage wire automatically, safely and without danger of short circuits or wire damage. According to the manufacturer on jobs involving bell wire, thermostat wire, communications wire, hollow tube lines and many other similar types, the T-25 has proved to be 5 to 10 times faster than any other fastening method." The striking power and holding power of the T-25 has been proved in exhaustive factory and on-the-job tests. In use the T-25 staple was found to have tremendous gripping power in even the hardest, rarely-used kinds of wood, plaster, etc.

The main safety factor is the easy one-hand operation. This leaves one hand always free to keep balance on ladders, etc. The stapler also eliminates snagging hands on nails or staples. To prevent any possibility of short circuits or damaged wires the staple is stopped automatically at the right height. The T-25 staple fits tightly because it is designed with a round crown yet it can never cut the sheathing or insulation.

The most radical feature of the new T-25 is its tapered striking edge. This exclusively-designed bottom edge tapers down to a size just slightly wider than the wire itself. That enables the T-25 to do what no other staple gun has previously: fasten wire in tight corners.

The staple used by the new gun is the Arrow T-25 Round Top Staple, precision-machined to the exact requirements of the T-25 Staple Gun. New extended staple points spread and lock themselves into wood giving the staples tremendous holding power. T-25 staples are available in 2 sizes: 7/16″ leg size and 9/16″ leg size; the same machine uses both sizes.—For complete data, ***Check New Product* 892.**

Hand Drill

MOLCO DRILLING MACHINES, INC., 1100-20th Street, N. W., Washington 6, D. C. announces the addition of a new self-sharpening diamond bit masonry hand drill.

This product will be known as the Model A-1 "Hanmole," a lightweight, high speed (3200 rpm) hand drill equipped with a special integral water injection system which forces water down the center of the drill bit to act as a cooling agent. Simple, quick-change adapters allow bit size differences of from ¼″ to 2″ O.D. The drill operates on standard 110 volt power. For complete data, ***Check New Product* 893.**

Modular Drafting Desks

DESIGNED FOR ENGINEERS and draftsmen, the new "Modulator" line of drafting desks is built around 14 basic models, which can be put together and interchanged for efficient and economical work planning. The desk-high steel units have plastic and linoleum work surfaces and lightweight aluminum drafting boards. All components will fit together and can be assembled into practically any office layout desired. The 14 basic styles provide many variations in drawer arrangements, drawing-board sizes and sizes of desk top or reference table.

Drawing-board sizes range from 26 by 40 in. up to 43½ by 72 in. The drawing board is constructed of Reynocell — a product of Reynolds Aluminum — and consists of two 0.035-in.-gauge aluminut sheets bonded to a honeycomb cellular core. The linoleum top surface offers exactly the right "tooth" for all grades of drawing pencils or inking. The board weighs only one-third the weight of a wooden board of the same volume and is not subject to atmospheric or climatic changes.

Drawing board is mounted on nylon rollers and is counterbalanced for vertical height adjustment up to 12 inches, permitting the draftsman to sit or stand with equal convenience. Board may also be adjusted to any angle from 10 deg off vertical to 10 deg from horizontal and can be locked at the selected angle by quick-action cam lever.—For complete data, ***Check New Product* 894.**

READER'S SERVICE DEPT.
T-E-M
1-15-56

■ PLEASE PRINT

NAME: .....

TITLE: .....

COMPANY: .....

ADDRESS: .....

Telephone Engineer Publishing Corp.
7720 N. Sheridan Road
Chicago 26, Ill.

■ **Please send me information on the following items: — (Check Items Wanted)**

NEW PRODUCTS

NP 891..... NP 892..... NP 893..... NP 894.....

SERVICES AND SUPPLIES

ADV. 1..... ADV. 2..... ADV. 3..... ADV. 4..... ADV. 5.....
ADV. 6..... ADV. 7..... ADV. 8..... ADV. 9..... ADV. 10 .....
ADV. 11..... ADV. 12..... ADV. 13..... ADV. 14..... ADV. 15.....
ADV. 16..... ADV. 17..... ADV. 18..... ADV. 19..... ADV. 20.....
ADV. 21..... ADV 22.....

THE BUYERS' GUIDE

ADVERTISING, Directories — *General Telephone Directory Co., 1800 Busse Highway, Des Plaines, Ill.*—[ADV. 1]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, *W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.*—[ADV. 2]

BELTS — CLIMBERS — PLIERS — SAFETY STRAPS — CONSTRUCTION TOOLS. *Klein & Sons, Mathias, 7200 McCormick Rd., Chicago 45, Ill.*—[ADV. 3]

BOOTHS—Acoustic Telephone — *Sherron Metallic Corp., 1202 Flushing Ave., Brooklyn 6, N. Y.*—[ADV. 4]

BRUSH & WEED KILLERS — *Thompson manufactures many types of brush and weed killers. Write for helpful information on specific problems. Thompson Chemicals Corp., St. Louis 3, Mo.*—[ADV. 5]

CABLE, *All Plastic, Aerial, Duct, Direct Burial, PBX, Switchboard.* — *The Ansonia Wire & Cable Co., Ansonia, Conn.*—[ADV. 6]

CORDS, Switchboard (with or without plugs), Instrument (retractable and regular) and Operators — *Commercial Cord & Supply Co., Inc., 26 Main St., Clifton Springs, N. Y.*—[ADV. 7]

CORDS, Switchboard & Telephone — *Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.*—[ADV. 8]

FURNACES — For quickly and economically melting lead and paraffin — *Mutual Liquid Gas Equipment Co., Inc., 3600 W. Imperial Highway, Los Angeles, Calif*—[ADV. 9]

INSULATORS, Porcelain — *Porcelain Products Inc., Box 300, Findlay, Ohio.*—[ADV. 10]

LIGHTWEIGHT PULLERS — *Coffing Hoist Company, 800 Walters St., Danville 5, Ill.* — [ADV. 11]

PIPE PUSHERS — *Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa.*—[ADV. 12)]

POLE HOLE DIGGERS — *For derrick mounted trucks. Tele-E-Lect Products, Inc., 9613 Minnetonka Blvd., Minneapolis 16, Minn.* —[ADV. 13]

POLES, Southern Yellow Pine — *Colfax Lumber & Creosoting Co., Inc., P. O. Box 23. Pineville, La.*—[ADV. 14]

POLES, Southern Yellow Pine — *Taylor Colquitt Company, 290 E. Main St., Spartanburgh, S. C.*—[ADV. 15]

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*—[ADV. 16]

PROTECTIVE EQUIPMENT — *Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.*—[ADV. 17]

REBUILT TELEPHONE & SWITCHBOARDS — *Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 26, Ill.*—[ADV. 18]

TRUCK BODIES — *Highway Trailer Co., Edgerton, Wisc.*—[ADV. 19]

WIRE, Insulated — **DATED DROP WIRE** — Neoprene or Weatherproof — *Alphaduct Wire & Cable Co., Milltown, N. J.*—[ADV. 20]

WIRE, Insulated Drop and Bronze or Copperweld — *Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.*—[ADV. 21]

WIRE, Telephone, for *all inside and outside uses* — *Whitney Blake Co., New Haven, Conn.*—[ADV. 22]

EMPLOYEES
POSITIONS
SERVICES

THE CLEARING HOUSE

FOR SALE
OPPORTUNITY
EQUIPMENT

Published in each issue of Telephone Engineer & Management. Advertising forms close on 1st of month. Rates 15 cents a word except for Situation Wanted ads, which are only 10 cents per word. In figuring cost of ads, count each word of address in number of words used. All ads payable in advance. Minimum charge—$2.00. Special rates for display ads on request. Send copy and box number replies to Telephone Engineer Publ-ishing Corp., 7720 N. Sheridan Road, Chicago 26, Ill.

HELP WANTED

HELP WANTED: — Office Manager for an expanding rural telephone cooperative. Must have at least two years experience. Pay commensurate with ability. Write to BEK Telephone Mutual Aid Corporation, Steele, N. D.; or phone 7241.

SALESMEN WANTED who call on Telephone, Gas, Electric Companies, to sell on commission our proven Safety Impaction Tools. Write Engineer Tool Co., 116-118 W. Main St., Lake City, Iowa.

JOURNEYMAN Station Installers, Journeyman Troublemen and Journeyman Linemen for growing Florida company for permanent employment. Write Inter County Telephone & Telegraph Company, Box 390, Fort Myers, Florida.

HELP WANTED — Chief operator large Midwest Telephone Co. in Midwest — fine working conditions, excellent town to live in, substantial salary, will have supervision of over 35 girls. Send complete details and small photograph if possible. Reply to Box No. 8991, Telephone Engineer Publishing Corp., 7720 Sheridan Rd., Chicago, Ill.

HELP WANTED: C. O. E. man experienced in A. E. Co. equipment and fair knowledge of carriers. Excellent opportunity to advance for right man. Well established company in Florida's Playground Area. State age and experience. Write Box 8996, Telephone Engineer Publishing Corp., 7720 N. Sheridan, Chicago 26, Ill.

CABLE SPLICERS, Station Installers, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 6100 N. 20th, Philadelphia, Pa.

POSITION WANTED: Plant Engineer or Manager with Independent company or REA cooperative. Experienced in all phases of outside plant engineering. Age 25, two year college, four year in telephone engineering. Write Carl Saine Jr., Box 6084, Richmond, Va.

FOR SALE

Reconditioned Stromberg-Carlson 1248 W Magneto desk sets Strong Alnico generator easily converted from magneto to common battery or dial operation. Shipped on approval.

Price .....$19.50 each
12 or more .....$18.50 each

BOHNSACK EQUIPMENT CO.
GERMANTOWN, NEW YORK

FOR SALE: Two IBM Electromatic toll billing machines; good operating condition, $100 each. Also, Graphotype for address plates, electric, old but serviceable, $35. Write: Box No. 8997, Telephone Engineer Publishing Corp., 7720 Sheridan Rd., Chicago 26, Ill.

Rebuilt, Refinished
Loud ringing bells. 1000 or 2500 Ohm @ $8.00 each. With Condensers @ $9.00 Each.
F.O.B. Chicago, Ill.
INDEPENDENT TELEPHONE REPAIR CO.
2137 W. 21st St.
Chicago 8, Illinois

FOR MAGNETO SWITCHBOARDS

W. E. #22-C Combined Jacks and Signals on #89-B Mounting (5 per strip) *NEW*
S. C. #350-B Combined Key and Supervisory Drop Assembly (Replaces #169-F Key) *NEW*
Federal #804-A Magneto Handsets for Desk or Wall Mounting—*RECONDITIONED*

BUCKEYE
TELEPHONE & SUPPLY CO.
1250 Kinnear Road Columbus 21, Ohio
HUdson 8-0655

RECONDITIONED EQUIPMENT

W. E. #202 Desk type hand set, W/El - Hand units, 3 Cond. Cords. @ $8.75 ea.
W. E. — El — Hand Units Only, 3 Cond. Cord. @ $3.00 ea.
Conn. Elect. Hand Units, 4 Cond. Cords, Capsule Receiver, & Transmitters. @ $4.00 ea.
Subcycle, Model M. 7.5-60 @ $25.00 ea.

Prices are F.O.B. Chicago

INDEPENDENT TELEPHONE REPAIR CO.
2137 West 21st St. Chicago 8, Ill.

SPECIFY **TELERING** for

Dependable and Economical Telephone Ringing Power Equipment.
Engineered for complete satisfaction.
Manufactured by
TELKOR, INC. Elyria, Ohio

CABLE-SPLICERS' WIPING CLOTHS

WIPING THE VERTICAL JOINT

Showing the up-right cloth in action.

Formed-flexible finishing cloths (Patented); Flat finishing cloths; Catch cloths; Crotch cloths and Up-right joint catch cloths. Made of world-prize HERRINGBONE TICKING or imported English MOLESKIN. If your jobber cannot supply you write us for literature and prices.

GEO. E. WILLIAMS CO.
3035 ALDRICH AVENUE, MINNEAPOLIS, MINN.

Professional Services

Stewart

TEST EQUIPMENT

Locates Line Trouble Fast

LINEMAN'S TEST SET .....(Model H)

CABLE TESTER .....(Model L)

LOCATOR-TESTER .....(Model A)

EXPLORING COIL AMPLIFIER

(Model E)

MIDGET DETECTO-METER

(Model D-1)

STEWART BROTHERS

Division of Instrument Laboratories

Chicago 10, Illinois

How to write a clear, logical technical paper

Step by step this authoritative book tells you how to select the type of report you should use, how to choose the most suitable forms and style, how to organize the material, and how to use figures, tables, and annotations—in short, make the report that is clear and understandable and wins acceptance for its ideas.

WRITING THE TECHNICAL REPORT

By J. Raleigh Nelson

University of Michigan
College of Engineering,
Professor Emeritus of English,

Third Edition, 356 pages, 5½ x 8½, 238 illustrations, $4.50

This practical guidebook takes up scores of specific points in the design and composition of the report and gives you exact directions for the setup of both long- and short-form reports, with numerous examples to guide you. In addition, the book outlines a system for the critical examination of the report to help you make sure it will meet the requirements of those who will read and use it.

Telephone Engineer Publishing Corp.

7720 Sheridan Road Chicago 26, Illinois

W. T. KING

PROF. ENGR. — TELEPHONE CONSULTANT
Engineering, Accountants, Valuation, Traffic, Depreciation Studies, Rates and General Management Services

306 So. Capital Lansing, Mich.
P. O. Box 216 Telephone 5-1034

EDWIN T. MAHOOD

Consulting Telephone Engineer

627 W. 67th St. Kansas City 5, Mo.

Jackson 3-4452

Save Money and Time!

TOLL TICKETS 1 LOUT on Board Paper ONLY 40¢ THOUSAND (MIN. 20,000)

TELEPHONE PRINTING SPECIALISTS FOR 49 YEARS

TELEPHONE 42-3341

CULLOM & GHERTNER CO.

PRINTERS • LITHOGRAPHERS

600 21ST AVE., N. • NASHVILLE, TENN.

SLOAN, COOK & LOWE

CONSULTING ENGINEERS

Suite 1344 120 South LaSalle Street CHICAGO

Appraisals—Original Cost Studies
Depreciation, Financial, and Other Investigations

TELEPHONE PRINTING

By People Who Know the Telephone Business.
See the Suttle Catalog

SUTTLE EQUIPMENT CO.

LAWRENCEVILLE ILLINOIS

What You Want When You Want It

Immediate Shipment from Nearest Warehouse Points

TELEPHONE & POWER SUPPLY, INC.

TOPEKA, KANSAS PHONE 4-8788

Construction Crews Station Installers
Central Office Installations
Cable Splicers Complete Engineering

HENKELS & McCOY

6100 N. 20th St., Philadelphia 38, Pa.
Now Operating in 22 States

CYRUS G. HILL, INC.

ENGINEERS

Plant—Traffic—Commercial
Valuation and Original Cost

134 S. LaSalle St., Chicago 3

CARL C. CRANE, INC.

Consulting Engineers

2702 Monroe Street, Madson 5, Wis.

Experienced in REA Procedures
Preallotment Surveys—Specifications
Design and Construction Supervision

JAY G. MITCHELL

CONSULTING ENGINEERS

APPRAISALS—COSTS—PLANT

7720 SHERIDAN ROAD CHICAGO
FOR MAIL BOX 523 EVANSTON, ILLINOIS

Your FCC second and first phone license in a hurry. Nation's largest professional school offers brand new, streamlined course. Guaranteed coaching. Full information rushed to you free. Get the best—it costs no more! Write:

Northwest Radio & Television School,

DEPT. MX, 1221 N. W. 21st Avenue, Portland, Ore.

Davis UTILITY PLANT CONSTRUCTION

Construction Co.

45 North Clark Street • Sullivan, Missouri

INSPECTION SERVICE

Of poles, crossarms, and preservative treatments. Analysis of wood preservatives. Consulting and specification writing. Inspectors stationed throughout the U.S.A.

A. W. WILLIAMS INSPECTION CO.
MOBILE ALABAMA
OVER 30 YEARS EXPERIENCE

CAN YOU HANDLE A FEW MORE ACCOUNTS

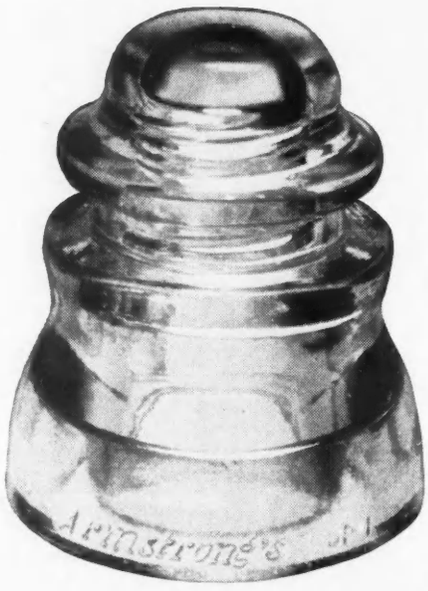
?

A Professional Card in Telephone Engineer Publications will be seen by the directing heads of thousands of telephone companies every month.

Rates are reasonable — Write for details. Address Advertising Manager, 7720 Sheridan Road, Chicago 26, Illinois.

100% INSPECTED

On-the-job failures are few and far between when you use Armstrong Glass Insulators. Each insulator is carefully inspected for flaws as it comes off the production line. Get details from Armstrong Cork Co., Glass and Closure Div., 295 Fifth Avenue, New York 16, New York.



Armstrong GLASS INSULATORS
for communications . . . for power

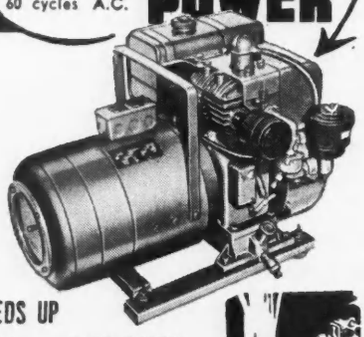
SIGNS ALONG THE LINES

LINEMEN AT WORK
USING
Crapo GALVANIZED
GUY & MESSENGER STRAND

Positive strength and durability economies, combined with the superior qualities of steel, make Crapo Galvanized Steel Strand a rugged performer. The heavy, ductile, tightly-adherent galvanized coating — applied by the famous Crapo Process — provides dependable protection for the steel, prolongs the expectant life of the strand. There is a size and grade of Crapo Galvanized Strand for every practical need.

INDIANA
STEEL & WIRE COMPANY, INC.
Muncie, Indiana

Wherever you are
the job is easily done with
Katolight Portable
60 cycles A.C. POWER



SPEEDS UP
WORK . . . CUTS COSTS!

Construction or maintenance is made simpler, faster and cheaper with a New Katolight Portable Power Plant. Operates saws, drills, hammers, soldering irons and other portable electrical tools and equipment. New blower attachment available for manhole ventilation or heating.

Gasoline models from 350 Watt to 50 K.W. DC models 500 Watt through 15 K.W. in standard voltages for continuous or standby service. Also Multi-Frequency Ringing Power equipment

WRITE FOR DETAILS

Katolight CORPORATION
Box 891-18, Mankato, Minnesota

Chance Purchases Control of Porcelain Products

F. GANO CHANCE, president of the A. B. Chance Co., Centralia, Mo., has announced that the Missouri firm has purchased 51 per cent of the stock of the Porcelain Products Co., manufacturers of insulators and other porcelain parts used by the electrical and telephone industries.

The Porcelain Products Co. has a high voltage insulator plant at Parkersburg, West Virginia, and a low voltage insulator plant at Carey, Ohio.

G. M. Ruoff will continue as president of the porcelain company. Newly elected officers include N. A. Toalson, executive vice president, C. C. Hough, treasurer, and R. F. Ausmus, secretary. The latter three hold similar positions with A. B. Chance Co.

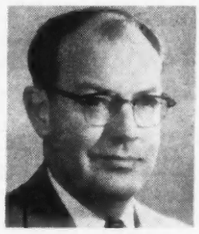
IBM Names Rissler To New Position

INTERNATIONAL Business Machines Corp., New York City, has announced the appointment of Charles K. Rissler as a special representative in its communications special department. In this post Mr. Rissler will assist in coordination of sales activities and planning of applications of IBM equipment to meet the needs of firms in the communications field.

Mr. Rissler, who attended the University of California, became associated with IBM in 1941 as an assistant sales representative in Oakland. He subsequently served in various sales posts, the most recent being branch manager in the Salem, Ore. office.

James Reed Joins A. B. Chance Co.

THE APPOINTMENT of James R. Reed as Market Research manager of the A. B. Chance Co., Centralia, Mo., has been announced by L. C. Hansen, general sales manager. He will head the Research Section of the sales department which was recently established with headquarters in the Centralia office. Reed organized and managed the Commercial Research Department of the Allis-Chalmers Co. and was with that organization for 10 years. For the past five years he has operated his own business.



J. R. REED

STROMBERG-CARLSON

TRANSMITTER

A DIVISION OF GENERAL DYNAMICS CORPORATION

VOLUME 4, NUMBER 10 • JANUARY, 1956

the second battle of Gettysburg . . .

When the President came, United was ready

"Let's be sure of all connections on the President's cable." Harold Statler, one of twenty United cable splicers.

In this case all the men were on one side; opposition was furnished by the inexorable limitations of time. The quiet town of Gettysburg, accustomed to that peace appropriate for the resting place of "those honored dead," has suddenly become a world capital — focal point in a network of communications which span the globe.

The United Telephone Company of Pennsylvania, serving Gettysburg and the immediate environs, had the herculean problem of engineering, obtaining and constructing 14 miles of 100-pair cable within a total completion time of less than three weeks. Facilities for more than doubling the daily average of 1500 long distance calls were provided with the splendid cooperation of the Bell System which meets the United Company at Hanover.

The dawn-to-dusk race, seven days a week, has now been won. There seems little question that Gettysburg now has the largest communication layout of any town of its size in the United States.

Stromberg-Carlson is proud that it was asked to play a part in this drama. Orders for additional trunk equipment for the sorely-taxed hotel switchboard, and a new 80-line PBX to accommodate the hundreds of "new residents," were expedited on an emergency basis through sales and production.

The United Telephone Company, in keeping with its policy of being ready for emergencies, had a Western Electric PBX which could be installed in President Eisenhower's farm White House well ahead of actual need. Another such PBX was placed in the President's Post Office headquarters.

The accomplishments of the United Telephone Company in Gettysburg have written another chapter in telephone history. Indirectly they may have a profound effect upon the history of the world.

This quartet from the United Telephone Company was largely responsible for increasing trunk capacity between Gettysburg and the "other world capitals." L-R: Robert Makibbin, plant supervisor — maintenance; Howard Federhoff, plant engineer; Robert Stover, plant supervisor — equipment; Walter Allen, engineer of transmission and extension.

Gettysburg's busy 18-position Stromberg-Carlson central office takes on a flood of additional traffic for government and news-disseminating agencies. Inward and toll traffic jumped over 35% the day the Eisenhowers arrived.

The XY Toll Ticketing Recorder

by James D. Mackay, Electro-Mechanical Development

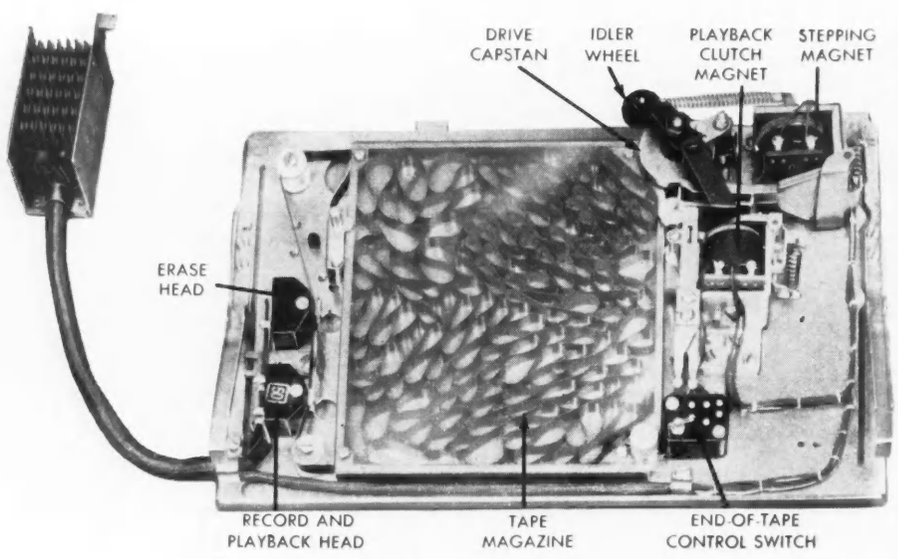
The heart of the XY® Toll Ticketing System is the XY Toll Ticketing Recorder. This mechanism — a magnetic recording device that at first glance looks very much like the XY Universal Switch, and mounts similarly — uses many of those time-tested and proven parts which are used on the famous Stromberg-Carlson stepping switch. A device of this type was chosen for the Stromberg-Carlson ticketing systems because of its unique ability to erase and re-use the endless loop of magnetic tape, thus enabling the operation of the ticketing recorder to be completely automatic for unlimited periods.

This recorder differs from the conventional type of tape recorder in that there are no reels used for tape storage; instead the trunk recorder employs a plastic magazine for holding and protecting the tape. This magazine has only two moving parts: the driving idler and the end-of-tape idler; thus a simple, trouble-free method of storing the endless loop of tape is provided. The tape used is made of DuPont's Mylar base, to which high output magnetic material is bonded. The strength of the Mylar base makes the tape practically indestructible. The tape passes around the end-of-tape idler, located in the lower right hand corner of the magazine, across the recording and playback heads, and finally back into the upper left hand corner. It is then passed through another channel to the driving members, located at the upper right hand corner of the magazine, where it is fed into the magazine proper. The driving members consist of the rubber drive idler and the rubber drive wheel of the capstan. The tape is sandwiched between these two members, thereby affording a highly efficient friction drive.

This recorder also differs from the normal type of tape recorder in that the signals are not recorded in the usual manner. While the normal method of recording is usually done while the tape is in motion, the method employed by the trunk recorder is to record on the tape while it is stationary. This method of recording affords two advantages: it means that tape is not wasted during any hesitation on the part of the subscriber while dialing, since the tape advances only in response to the dial impulses; it also produces better output characteristics since the recorded signal is a sharp distinctive magnetic impression.

The recording of these signals is done by the use of a two-track head which is used for both record and playback. After the head is energized and the signal is recorded, the tape is advanced one step and waits for another signal to be recorded. The method of stepping is done by a stepping magnet which engages the ratchet of the capstan. The rubber drive wheel of the capstan, being in contact with tape, advances the tape 0.057 of an inch. This type of stepping employs the same principles of advancement that have proven so satisfactory on the XY Universal Switch.

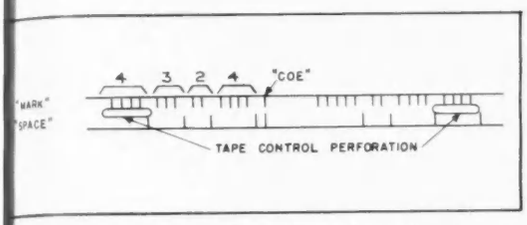
After having recorded a full tape, or whenever it becomes desirable to play back the recorder to obtain the information stored on the tape, a clutch is energized. This clutch looks and works like the release magnet used on the XY Universal Switch. However, in addition to disengaging the retaining pawl, its primary function is to actuate an arm which positions an idler wheel between the capstan main wheel and an external drive wheel. This external drive member is mounted on a common drive shaft which is mounted in the back of the trunk recorder cells. This driving system advances the tape at a uniform rate of 3 inches per second for playback. The tape can also be advanced at 6 inches per second if it is necessary to position the tape for playback even though the tape has not become



The XY® Toll Ticketing recorder.

full. This additional speed range aids in cutting down the amount of trunk holding time by the recorder during the playback condition.

During this playback cycle, the magnetic impressions that have been recorded on the tape are passed in front of the record-playback head. The movement of these impressions across the head causes the coils to become excited, and an impulse of voltage is created for each magnetic impression on the tape. Thus the pulses originally recorded on the tape as magnetic impressions are converted back into pulses and are read by the associated readout equipment.



Diagramatic illustration of the method of recording on tape.

However, when playing back, it is necessary to prepare the tape for new recordings. In order to provide a clean tape for re-use, the tape is erased as the information is being read out. This operation is accomplished by an erase head which spans the full width of the tape, thereby erasing both tracks simultaneously. Thus when all of the information on the tape has been read out, the cycle is completed and the tape is again in a condition for recording.

It is, of course, necessary to be able to control the return of the tape to its starting position before and after playback, and also to indicate the approaching end of tape, otherwise overlapping of information might result. This control of the end of tape is managed by means of perforations located in the center portion of the tape and an actuating arm which controls a snap action type switch. When a perforation in the tape passes under the actuating arm, the arm falls through and actuates the switch, the advancing tape then withdraws the arm and the switch is restored to its normal position. There are a total of three perforations; depending upon sequence of operations, these perforations will signify: when the tape is ready for playback; when it is ready for recording; and when the associated trunk should not accept any more calls.

Now that the mechanics of the various components have been explained, an example of the signals as they appear on the tape will be given. In order to illustrate these signals, assume that a four-digit number such as 4324 is to be recorded. When the subscriber dials the first digit 4, four impulses are generated by the dial. Each of these four impulses in turn would cause the energization of the upper track of the record head and then cause the magnet to step the tape. Therefore, the digit 4 would consist of four magnetic impressions equally spaced on the tape. Likewise the other digits would each consist of a number of magnetic impressions equal to the number of the digit itself. To distinguish the last impression of one digit from the first impression of the following digit, a signal is recorded between digits on the lower portion of the tape. This signal is marked on the tape in much the same manner as the impressions for the digits are made, the difference being that the lower track of the head is used, and it is the release of the inter-digit relay which initiates the energization of the head and the stepping of the magnet. The signals which represent the pulse signals are called "*MARK*" pulses, the signals which represent the spacings between digits are called the "*SPACE*" pulses. To be able to distinguish the end of one call from the start of another, a third signal called "*COE* "is used. This signal consists of a "*MARK*" and "*SPACE*" signal which are recorded simultaneously when the trunk circuit is released.

The trunk recorder is capable of storing the party-identifying digit, the called number, the calling number, the elapsed time of the call and the clock-calendar information which consists of the time of day, day of week, day of month, and month. This information is played back through the system when needed and is used to make up the ticket for billing. This recorder, ingeniously designed to perform its several functions automatically, over and over again, is the heart of the XY Toll Ticketing System.

Meet Bill Rockwood

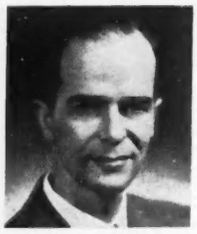
Assistant to the Vice-President

Too many hundreds of telephone people know Bill Rockwood to begin even a biography with William. That's the kind of a fellow he is: friendly, broad-shouldered, quick to cut through formalities and get things done. Since 1951, Bill Rockwood has been assistant to John Voss, vice president Telephone Division, and John would be the first to emphasize how much this arrangement has improved efficiency, as the division has undergone a phenomenal period of expansion.

Bill is a native Rochesterian; with his wife Eileen (Hartigan), their four children, Patricia (12), William (8), Stephen (7) and Eileen (6) they somehow manage to squeeze in many church and civic activities as well as family fun, Little League, and Scouts.

After graduating from Yale University, Bill tried a stint at selling insurance before entering the credit department of Stromberg-Carlson in 1941. A four-year tour as Captain, Infantry, in France and Germany interrupted — then shortly after his return to the company, Bill was selected to be office and credit manager in the Chicago Branch before assuming his present position in the Rochester home office.

From this "field listening post" — and Bill is a good listener — he gained an understanding of the operating man's problems which has proved invaluable in dealing with home office administrative problems. Yet Bill's approach is always personal . . . "Now there's Dick Doe out in Appleton; let me tell you about his problem." And "Dick" knows this, and is grateful.



George Forbes

The Postman's Holiday: No. 5

We should have accepted the Laniers' kind offer to stay the night in West Point, Georgia.

Hardly did we expect the Keystone Cop routine that lay ahead of us on the road south to Dothan, Alabama. All in one night: a flat tire, a torrential rain, the "no vacancy" sign on the first of the two motels at Eufala; scanty supper at 10. Then relief — or so we thought. After a low-flying carport at the next motel crashed our car-top luggage to the ground, we dragged ourselves into the cabin, only to discover it just wouldn't do. So . . . back wearily into the car. Then, the coup de grace . . . another flat, and this time no spare!

It must have been our guardian angel's night off!

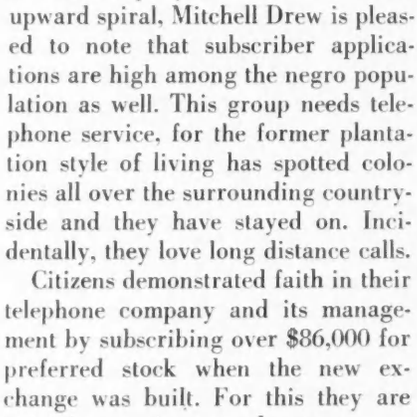
It was almost noon when we reached *Dothan*, trading and manufacturing hub of southeast Alabama. I was sorry to miss Carl Kirk, manager of the United Telephone and Telegraph Company, but Mr. F. W. Kuhn, assistant secretary and treasurer, extended a welcome and told something of the growth of this company serving 22,500 subscribers through 22 exchanges. In fact, additions are the principal problem, with average station gain running over 150 per month, as this area becomes industrialized.

Still raining, but Florida, Land of Sunshine, was just over each successive rise, and at last it was there before us. Music, orange juice, "glad you're here" at the welcome office hard by the state line. This became genuinely personal when we found Mrs. Allene Cantey and Mitchell Drew waiting for us at the *Quincy* Telephone Company office.

Tobacco — shade grown wrapper for cigars in 25,000 pounds a day quantities; "fuller's earth" — we are still marvelling at its efficacy in cleaning clothes; and cattle — improved breeds with some imported Brahmans growing sleek on a newly developed fodder, are responsible for the economic well-being of Quincy.

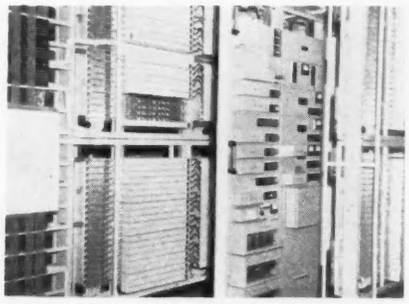
The story of the Quincy Telephone Company and the cutover of their 1200-line XY® dial exchange appeared in the May, 1954 TRANSMITTER. Even as your editor writes these notes, the Bell Company should have completed its end of the inter-toll network which had been engineered at Quincy for some time. As business for the company continues in an ever upward spiral, Mitchell Drew is pleased to note that subscriber applications are high among the negro population as well. This group needs telephone service, for the former plantation style of living has spotted colonies all over the surrounding countryside and they have stayed on. Incidentally, they love long distance calls.

Citizens demonstrated faith in their telephone company and its management by subscribing over $86,000 for preferred stock when the new exchange was built. For this they are receiving service second to none.



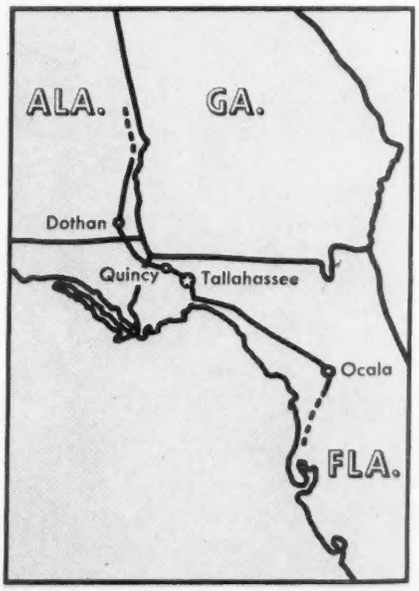
Pivotal cog in the smooth operation of the Quincy company is the engineering skill of Frank Kibilka, Plant Superintendent, seated, shown at cutover time with J. C. Byrd, Outside Plant Manager, standing left, and W. L. Mollands of Stromberg-Carlson.

Quincy chief operator Annie Belle Smith at C. O. desk; Gladys Johnson at new flat top information desk.



The XY dial office at Quincy, Florida is a splendid example of the way a telephone company can supplement its own finances and system design with the complete financial and engineering services of the Stromberg-Carlson Credit Corp.

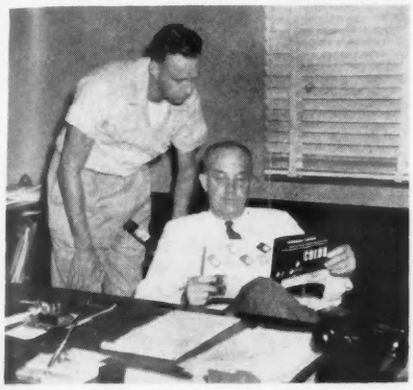
Mrs. Allene Drew Cantey, President, and son Mitchell Drew, Vice President, have an unusually close and human approach to the everyday tasks of running the Quincy Telephone Company.



From cotton to oranges. Who said Florida is crowded only in the winter season?

The Southeastern Telephone Company at Tallahassee never lacks for a view, including some of the largest oak trees in the state.

Section of the Information and Special Services desk at Ocala's busy Stromberg-Carlson toll board.



Blair Stone, Division Manager of Southeastern Telephone Company, is "caught" by Art Beam (standing) reading up on colored telephone literature.

Our spirits were buoyant after the Quincy visit. It's just a short hop to *Tallahassee*, state capital, home of Florida State University, the Arthur Beams' (Stromberg-Carlson representative) and Blair Stone's Southeastern Telephone Company. Tallahassee is friendly, prosperous and growing fast like all Florida, where 4,500 new people (births and move-ins) appear *every week*. Take just one of Southeastern's 30 exchanges — Destin — as an example: in 1952 this strip of pure white sand was literally unmolested by human visitors; now there are three $1,000,000 hotels and the third telephone installation is almost outgrown. Aside from the magnetism of an all-year resort, the area has felt the pressures of permanent Air Force bases. When existing central offices prove inadequate, new exchanges have to be created. Blair Stone is a busy man, whose training admirably fits him for the job.

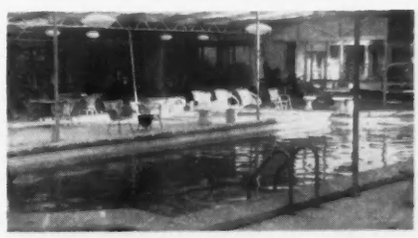
Our next objective was *Ocala*, headquarters of the Florida Telephone Corporation. Laying our course via Wakulla Springs, we thoroughly enjoyed the fish and other marine life 180 feet straight down through cerulean blue water. And of course we sang many encores of the Stephen Foster melody as we crossed the Suwannee River.

Mr. Max Wettstein, president and general manager, welcomed us to the "heart of the citrus belt," pointing out what was all too apparent as we started the quest for accommodations; that Florida is now just as popular in summer as winter. (In fact nearby Silver Springs recorded its largest crowd on last July 4th). This is fine for the telephone company as service to motels and resort centers is now largely on a 12 month's basis.

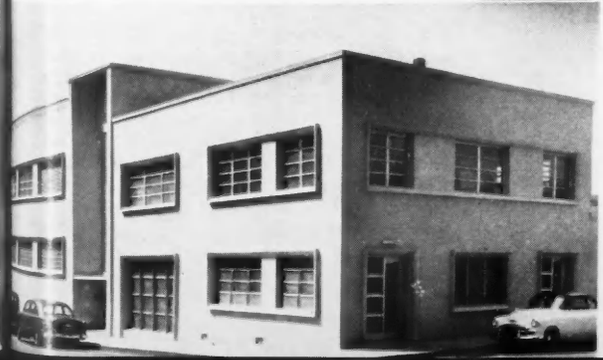
The 3,000-line XY office serving Ocala has recently added 1,000 new terminals; Winter Garden has a 26-position Stromberg-Carlson #3 Toll Board in a new building which is a showplace. Pasco Packers, Minute Maid and other citrus processors have an insatiable thirst for more telephones just as people all over have developed a thirst for the vitamin-ladened breakfast drink.

Max comes by his telephone know-how naturally; his father Otto Wettstein, Jr., at 80, *was* the telephone genius of this part of Florida and still has a part in the company activities. Max made it clear that the Florida Telephone Corporation operates as a team, and particularly mentioned the responsibilities of Bob Eshbaugh, chief engineer, John Riggs, plant superintendent, and C. C. Leiby, controller, as well as the several local managers. He then reached for the telephone and found us wonderful accommodations where none had existed before. Thankfully, we said goodbye and good luck.

Impressive building at Ocala exchange of the Florida Telephone Corporation.

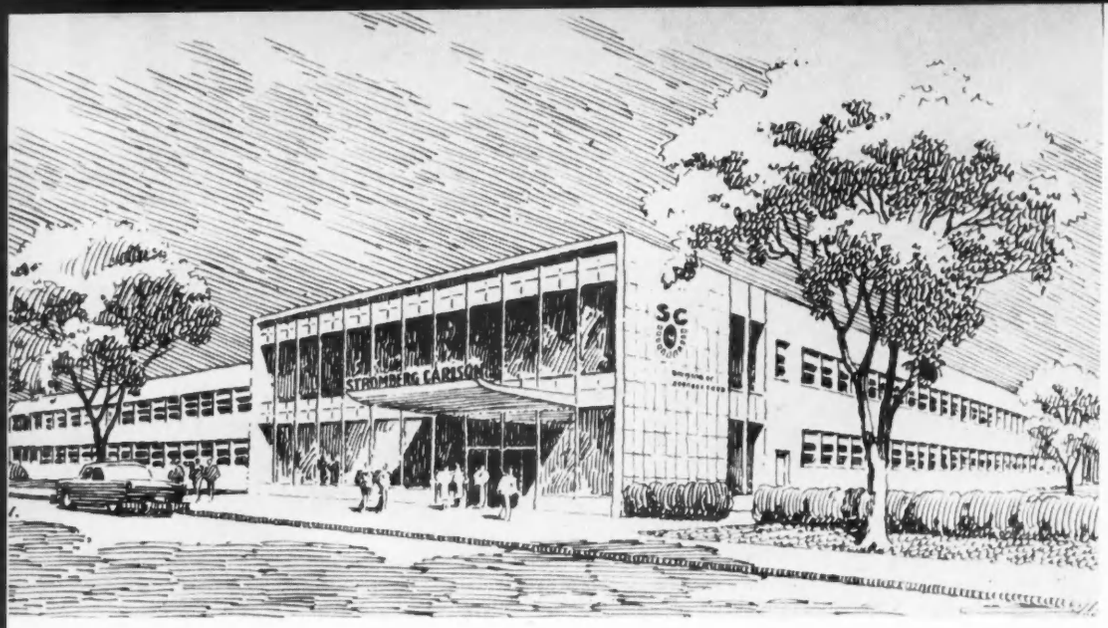


Wonderful motels with terrific swimming pools are making Ocala an all-year mecca for tourists.



Max Wettstein, President of the Florida Telephone Corporation starts us on personally conducted tour of Ocala offices.

Ocala exchange business office — beehive of activity.



Construction now under wa at north end of present hom office and factory is part o a program that will add mor than a quarter of a millio square feet to Stromberg-Carl son's office, research and manufacturing facilities.

Stromberg-Carlson and the General Dynamics family: 1956

Ever since the merger of Stromberg-Carlson into the General Dynamics Corporation on June 28, 1955, the interest and attention of the Independent telephone industry has been caught by compelling headlines. Not least of these was the ground-breaking this past fall for the $5,000,000 factory addition and Administration-Research Center as "a significant start on a program of extensive growth for Stromberg-Carlson." Construction is progressing on schedule.

First goal in this building program will add some 140,000 square feet of new manufacturing space. Before the end of the year, there is no question but that Stromberg-Carlson can produce more of the top quality equipment of the type which has made its name respected in telephone circles. This is the immediate target, embracing known needs in fields which are already thoroughly defined and familiar.

The union with General Dynamics, however, is a direct step into the future, with horizons rolled back by the limitless possibilities in peacetime applications of electronics and nuclear fission. The same boldness — unlimited by traditional methods — which launched the atomic-powered submarines, Nautilus and Sea Wolf, is now being felt in a stimulation of research in advanced telecommunications and electronic devices. To further this program, the new Research Center will follow completion of the factory unit. First fruits of this research are now in pilot tests, but much of the program falls into the same class as work on the transistor a few years ago . . . where specific usage can only be predicted in broad areas for the years ahead.

As a newcomer to the General Dynamics family, Stromberg-Carlson is

John Jay Hopkins, Chairman of the Board and President of General Dynamics Corporation, at right, and Robert C. Tait, President of Stromberg-Carlson and a Senior Vice President of General Dynamics, at ground-breaking on October 26, 1955.

The atomic-powered submarine USS Nautilus, built by Electric Boat Division of General Dynamics Corporation, is pictured under way on her initial sea trial in Long Island Sound on January 17, 1955. The Nautilus returned to home base, thoroughly proven, to take Secretary of the Navy Charles S. Thomas and top officials of the Atomic Energy Commission on a "familiarization" cruise the weekend of November 25.

proud to be in company with such divisions as *Convair*, producer of supersonic jet airplanes and currently working on atomic-powered aircraft; *Electric Boat*, whose Nautilus is still operating on original energy after twelve months at sea; *Electro Dynamic*, producers of electric motors of advanced design; *Canadair Limited*, builder of F-86 Sabre jets and now engaged in a cooperative effort with the Bristol Aeroplane Co., Ltd., of England on long range transoceanic turbo-prop aircraft; and finally *General Atomic*, a division concerned with Dynamics' long-term nuclear research program.

Whether the years ahead will see an increase or a lessening of those tensions which now divide mankind, the path all nations will follow is already outlined by our present knowledge of atomic reaction. In the words of John Jay Hopkins, Chairman of the Board and President of General Dynamics Corporation, "If we succeed in our long-range international atomic power program, we will have helped to increase the standards of living, health and education of peoples abroad . . . made lasting friendships while lifting a substantial burden from our Treasury . . . have proved and taught the soundness of the American free enterprise system . . . For these objectives no risk is too great, no price is too big."

Successful development of the Convair B-36 as a carrier for reconnaissance fighter-type aircraft was accomplished to the complete satisfaction of the United States Air Force two years ago. New developments, not yet made public, are under way.

The famous "Pogo" vertical take-off fighter. Vice President Nixon this December presented the Harmon Trophy to Colonel Coleman for piloting this plane in history's first vertical take-off to horizontal flight and back to tail-down landing.

Yoncalla, Oregon. Welcomes XY Dial

It's a woman's world in Yoncalla, Oregon, where Mrs. Kittie Jobe has managed the telephone company for 12 years, and her daughter Mrs. Vincent Duncan is vice president.

A well-run woman's world, at that: When Mrs. Jobe took over the company in 1943 there were 35 subscribers. This fall the company cut over a spanking new XY® Dial System to serve over 400 subscribers. And she'll be ready for the inevitable increase in patrons.

Besides bringing XY dial to Yoncalla, Mrs. Jobe has equipped the company with a new stone building, extensive cable lines, and over 100 miles of rural line.

In addition to her own repairmen and the Stromberg-Carlson installers, Mrs. Jobe received assistance on installing long distance equipment from the Pacific Telephone and Telegraph Company.

Cutover time is a time of great activity in the equipment room. Men from the local company, from Pacific Tel. and Tel., and from Stromberg-Carlson all worked on the Yoncalla installation. At left, Mrs. Jobe watches Arnie Bjorg and Zee Thompson wiring at MDF.

Seated at right foreground is Mrs. Kittie Jobe, owner of the Yoncalla Telephone Company. Standing behind her are Vivian Phelps and Mrs. Zee Thompson. Operating switchboard is Mrs. Vincent Duncan, vice president.

President and Mrs. H. Y. Price and three of their boys.

New 1300-Line XY System at San Marcos, Texas

Deep in the heart of Texas is the bustling community of San Marcos.

With San Antonio not far away to the southwest, Austin in the other direction, and Edward Gary Air Force Base nearby, San Marcos is growing lustily.

And so is the San Marcos Telephone Company. On November 5, this progressive company cut over a 1300-line XY® Dial System, serving the city's 2700 subscribers.

An attractive new building houses the equipment along with the company's business offices. Citizens and dignitaries paid their compliments to this progressive company at an open house, during which they examined the new XY equipment, the new Stromberg-Carlson No. 3 toll switchboard and other modern improvements.

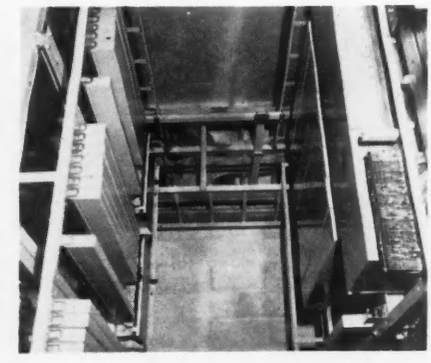
President of the San Marcos company is Mr. H. Y. Price, Jr. His first toll call was to his mother in Evant, Texas — where it was received through a telephone system founded by Mr. Price's father.

Attractive new exchange building at San Marcos.

New 6-position Stromberg-Carlson No. 3 toll board, ready to take over.

Interested onlookers: (l. to r.) Huffman Baines, consulting engineer; W. Collins, Collins Directory Co.; Rolla Johnson and L. A. Wallace, Gulf States Telephone Co.

Cable layout (looking up) in XY equipment room at San Marcos.



Old manual board 20 minutes before cutover.

STROMBERG-CARLSON TRANSMITTER

Published by
STROMBERG-CARLSON COMPANY
A DIVISION OF
GENERAL DYNAMICS CORPORATION
Rochester 3, New York
GEORGE B. FORBES, *Editor*

XY is a registered trade-mark of Stromberg-Carlson Comp

INDEX TO ADVERTISING

Acme Visible Records, Inc. 14
Alphaduct Wire & Cable Co. 82
American Creosoting Co. .....
American Tel. & Tel. Co. 58-59
Anaconda Wire & Cable Co. .....
Arlington Hotel .....
Ansonia Wire & Cable Co. 25
Armstrong Cork Co. 92
Arrow Fastener Co. .....
Automatic Electric Sales Corp. 17, 52-53, 67, 79, 103

Bakelite Co. 8B, 8C, 8D, 8E
Bashlin Co., W. M. .....
Bohnsack Equipment Co. 90
Berry & Co., L. M. 2
Inside Front Cover
Buckeye Telephone & Supply Co. 85

C & D Batteries, Inc. .....
Cable Spinning Equipment Co. 68
Calculagraph Co., Inc. 33
Chance Co., A. B. 60, 84
Commercial Cord & Supply Co. 5
Communi-Catering 91
Cook Electric Co. .....
Copperweld Steel Co. 13
Corey Steel Co. .....
Crane, Carl C. 91
Cullom & Ghertner Co. 91

Davis Construction Co. 91
Donnelley & Sons, R. R. 85

Exide Industrial Div'n
The Electric Storage Battery Co. .....

General Cable Corp. .....
General Insulated Wire Co., Inc. .....
General Telephone Directory Co. 104
Back Cover
Gould National Batteries, Inc. 36
Graybar Electric Co. 34-35
Greenlee Tool Co. .....

Harris-McBurney Co. .....
Henkels & McCoy 90-91
Highway-Trailer Co. .....
Hill Engineers, Inc., Cyrus G. 91

Independent Tel. Repair Co. 91
Indiana Steel & Wire Co. 92
International Harvester Co. .....
International Standard Electric Corp. .....
International Standard Trading Corp. ..

Kaiser-Willys Sales .....
Kato Engineering Co. 92
Kaufmann, H. J. Co. .....
Kearney, James R., Corp. .....
Kellogg Switchboard & Supply Co. 18-19, 20-21, 22, 74-75
Kimble Glass Co. .....
King, W. T. 91
Klein & Sons, Mathias .....
Koiled Kords, Inc. 101

Lambda-Pacific Engineering Co. .....
Leich Sales Corp. 46-47
Line Material Co. —
A McGraw Electric Co. Div. .....
Loomis Advertising Co. 27
Lorain Products Corp. 78
Lowell Insulated Wire Co. 30

Mahood, Edwin T. 91
Markwell Mfg. Co. 54
McCabe Powers Auto Body Co. .....
Mitchell, Jay G. 91
Murphy Engineering Laboratories, Inc. 69

Natco Corp. 101
National Scientific Laboratories, Inc. .....
National Telephone Supply Co. 4
Neale Construction Co. .....
North Electric Co. 10-11
Northwest Radio & Television School 91

Owens Illinois Glass Co. 55

Page & Hill, Inc. 78
Piedmont Wood Preserving .....
Porcelain Products Inc. .....
Preformed Line Products Co. 6

Raytheon Manufacturing Co. .....
Reliable Electric Co. 40
Remington Rand, Inc. .....
Republic Creosoting Corporation .....
Reynolds Metals Co. .....
Roll-A-Reel Corp. 54
Runzel Cord & Wire Co. 26

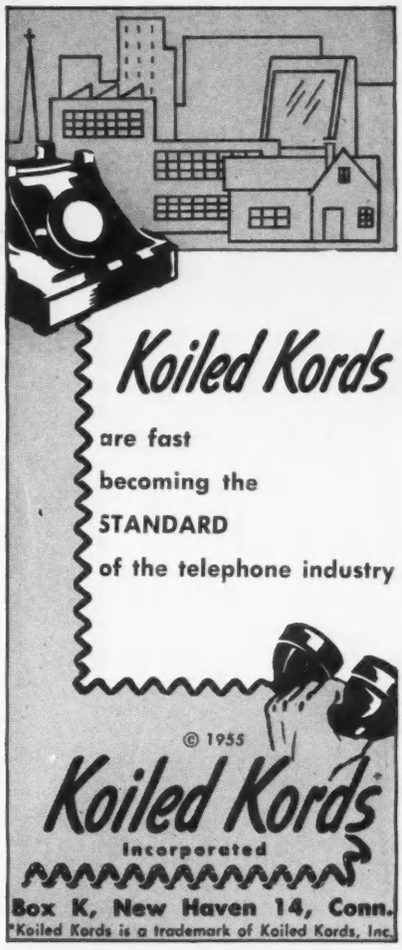
Schauer Manufacturing Corp. 12
Seymour Smith & Son, Inc. .....
Sloan, Cook & Lowe 91
Stewart Bros. 91
Stromberg-Carlson Co. 9, 38-39, 72-73, 80-81, 93-100
Superior Cable Corp. .....
Suttle Equipment Co. 77

Taylor-Colquitt Co. 85
Tel-E-Lect Products, Inc. .....
Telephone Answering & Recording Corp. .....
Telephone Engineer Publishing Corp. 69
Telephone & Power Supply Co. 91
Telephone Repair & Supply Co. .....
Telephone Supply Corp. .....
Teletype Corp. 22
Telkor, Inc. 90
Thompson Chemicals Corp. 56

U. S. Independent Tel. Assoc. 50
U. S. Steel Co., Coal Chem. Div. .....
U. S. Steel Co., (American Steel & Wire) 83
Utica Drop Forge & Tool Corp. .....
Utility Tool & Body Co. .....

Western Electric Co. .....
Whitney Blake Co. 3
Williams, Geo. E., Co. 91
Williams Inspection Co., A. W. 91

York Hoover Corp. .....



NATCO
CLAY CONDUIT
Costs less in the long run
NATCO
QUALITY CLAY PRODUCTS SINCE 1889
The proved and standard protection for Underground Telephone Cables. Highest quality and full line of shapes.
NATCO CORPORATION
formerly National Fireproofing Corp.
327 Fifth Avenue, Pittsburgh 22, Pa.

the BACK of the BOOK

By John G. Reynolds

"Simple — Eh What?"

AN ENGLISHMAN was visiting an American friend in the United States, relates the *Southwestern Bell Telephone News* under the heading "As you may have heard."

"With all due respect, my boy," commented the Londoner, "I think our English custom is better than saying 'Hello' as you do here in America."

"What do you say in England?" asked the American.

"We say, 'Are you there?' Then, of course, if you are not there, there's no use in going on with the conversation."

Story From Utah

RECENT telephone construction activity in North Ogden, Utah, caused Merle Shupe of the Ogden City *Standard Bearer* to write — "This community probably has more pole climbers at the present time than any other place in the whole country — all on account of the community getting the newest telephone service to be had around the country."

Digging up a bit of telephone history, Mr. Shupe reported that — "Time was when the town boasted of one lone telephone. Located in the mercantile store owned by E. J. Marshall Sr., it was the center of attraction around the turn of the century. Soon after that time a switchboard was installed in the store, and folks living up and down the country lanes were calling their neighbors by telephone instead of having to run their errands on foot."

Sarah Spackman, Ethel Maycock, Eliza Hall and Rose Dean were some of the first operators. Some days were pretty dull, just like any other job. But then there were times when things really popped around the old board. Around 1906 when the board was moved across the street to a building all its own, Sarah Spackman, now Sarah Brigham, recalled a terrific electric storm in particular.

Mrs. Brigham was manning the switchboard when a brilliant flash of lightning lighted up the entire board. When she came to, she was lying on the floor — minus her petticoat.

"How I ever lost my underskirt, I'll never know," she chuckled. "I really was embarrassed, but there wasn't anything I could do about it."

New Use

THEY TELL US a Brecksville, Ohio, father has added to the value of the outdoor telephone booth. Recently, the man ushered his little 2½-year-old daughter into the booth, closed the door and then proceeded across the street on an errand.

When the man came back to retrieve his happy little girl from the kiddy corral, a telephone employe expressed verbal interest. Said the proud papa, "I always put her there for a minute while I shop. She loves it and really looks forward to her visit to the booth-baby-sitter."

"Not Up To Snuff"

WHEN the Grand Valley Telephone Co. completed its dial cutover at Onondaga, Mich., Mrs. Polly Cook cranked up her old telephone switchboard for the last time and no one shed a tear, including Mrs. Cook. The old system just wasn't up to snuff.

The community is particularly pleased with the $105,000 dial exchange since the whole operation is strictly a local promotion. Back in 1949 the first rumbles were heard about the old system, and Michigan Bell was invited to take over the territory. The company couldn't handle it at that time and so community feeling boiled up at township halls of Onondaga and neighboring Tomkins. Committees were appointed and a spirited program was kicked off with plenty of local support.

Then, working with the Michigan Independent Telephone Association, the present Grand Valley Telephone Co. evolved, with practically all stock held by local residents.

And now, after plenty of hard work, Onondaga residents have new telephone instruments and switchboard equipment and are set for nationwide long distance dialing as it becomes available.

But the real fancy service isn't too important to Onondaga-Tomkins residents. They just wanted reliable equipment — something "that won't fall apart every time the wind blows or a squirrel walks down the wires," according to Mrs. Cook.

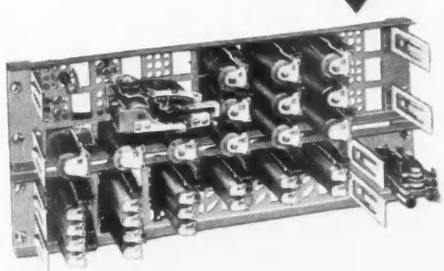
"I'll be out of a job . . . and glad," she says. "It'll be sort of a vacation . . . I've had the switchboard in my home for 20 years . . . just think, no more late calls . . . no more complaints . . . it will be wonderful!"

Telephone Prankster

AN ANCIENT practical joke, probably as old as the telephone itself, is being perpetrated these days on Hanford, Calif. people. It consists of a joker calling up a friend, disguising his voice, and pretending to be a telephone repair man. "Read your number to me loud and clear," he orders. Then it must be done again because he hears some "interference."

Then the faker demands, "Blow real hard in the receiver . . . no, harder than that." After several hearty puffs the joker breaks into hearty laughter and reveals. "Thanks, very much, you have just succeeded in blowing all the birds off all the telephone lines in Hanford."

with
AUTOMATIC'S DIAL SPEED TESTER



Watch a man testing a dial with Automatic's Dial Speed Tester and you'll agree: *this job's been simplified!*

No longer does he lose time setting up test equipment — no longer need he ask help from a man in the exchange. Now he merely dials the number of the Dial Speed Tester, then dials "0". One, two, or three "splashes" of tone tell him if the dial is slow, correct, or fast.

Automatic's Dial Speed Tester makes dial checks simple, quick, and economical. Relay-rack mounting and few connections assure easy installation. Rugged telephone components guarantee dependability. Write today for Circular TM1707.

Address: *Automatic Electric Sales Corporation,* 1033 *W. Van Buren St., Chicago* 7. *Or call HAymarket* 1-4300.

AUTOMATIC ELECTRIC®

ORIGINATORS OF THE DIAL TELEPHONE

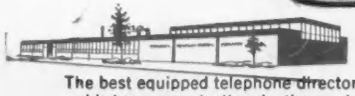
GENERAL SYSTEM INDEPENDENT

always room for improvement

If your Directory is perfect, stop right here.

On the other hand if you believe . . .
as do independent telephone companies
serving over 4400 communities . . .
that its profits can be increased, ask us about our
COMPLETE DIRECTORY SERVICE PLAN.

GENERAL SYSTEM



The best equipped telephone directory publishing organization in the world.

INDEPENDENT

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Busse Highway · DES PLAINES, ILLINOIS · VAnderbilt 4-2164

ERIE, Penna. · G. Daniel Baldwin Building · Tel: 2-4187
LAFAYETTE, Indiana · Potter Building · Tel: 2-3720
LEXINGTON, Kentucky · 152 Barr Street · Tel: 4-7618
LONG BEACH, Calif. · 604 Pine Avenue · Tel: HEmlock 6-7221
MADISON, Wisconsin · Tenney Building · ALpine 7-1667
SAN ANGELO, Texas · 110 South Taylor St. · Tel: 6738
SPOKANE, Wash. · 108 N. Washington St. · MAdison 4336
SPRINGFIELD, Ill. · Myers Bros. Building · Tel: 3-1236